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The Contribution of Human and Social Capital to Sustained Economic Growth and Well-Being

International Symposium Report

Human Resources Development Canada (HRDC) and Organisation for Economic Co-operation and Development (OECD)
September 2001

This book records the proceedings of a joint Human Resources Development Canada (HRDC) and Organisation for Economic Co-operation and Development (OECD) international symposium on the effects of human and social capital on economic growth and well-being held in Quebec City in March of 2000. The symposium achieved several specific milestones:

- It brought together a number of different perspectives and disciplines in the analysis of the contribution of human and social capital to economic growth, productivity, social cohesion and human well-being.
- The symposium situated the discussion of economic growth in a wider social context. It highlighted the various human and social antecedents of growth as well as the broad "market" and "non-market" social returns to investment in learning and social capital.
- It clarified concepts and relationships in the area of human and social capital and considered the role of public authorities in areas such as learning, social programs and labour market responsibility.
- It provided directions for further analytical work and data development in order to gauge more precisely the importance of social antecedents for growth and well-being.

"The papers in this volume provide solid reviews of existing knowledge, present many new results, and stake out appealing directions for further research. There remains much to be discovered about the linkages between human and social capital and sustained economic growth and well-being. Thus these papers cannot provide the last word, but they are generally the latest words, and expose many intriguing paths to follow." *From the Introduction of this volume by John F. Helliwell*

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Preface

One of the most striking economic phenomena of recent decades has been the sharp disparity of growth rates across Organisation for Economic Co-operation and Development (OECD) countries. The consequences of this disparity, in terms of differing performances in employment and prosperity, have been a cause of concern both for politicians and for citizens. Added to this is a concern about how the fruits of economic growth are allocated within and between present and future generations. There have been worrying signs of growing income inequality, exclusion of particular groups and indications of increased social dysfunction. The intertemporal and intergenerational equity aspects of economic growth are of growing importance given demographic and social pressures. Access to learning throughout life as well as active participation in the labour market remain important conditions for social cohesion and the maintenance of consensus on the reforms required to underpin sustained growth and well-being. In sum, recent developments pose a challenge to governments and civil society in general.

In this context, and responding to a mandate from Ministers meeting in the Council of the OECD in May 1999, the OECD Secretariat initiated a program of work to identify some of the factors that influence growth, as well as policies that could strengthen overall economic performance. Ministers asked the OECD to study the causes of growth disparities, and identify factors and policies which could strengthen long-term growth performance. These include areas such as rapid technological innovations and the growing impact of the knowledge society and its demand on human capital. The program of work initiated seeks to address a broad set of questions and issues related not only to the factors influencing economic growth, but to how learning, networks and civic traditions contribute to a variety of economic and social outcomes and how these outcomes need to be balanced to achieve sustainable economic and social development.

In Canada, the Policy Research Initiative (PRI) of the federal government produced a report in 1999 entitled *Sustaining Growth, Human Development and Social Cohesion in a Global World.* An emerging theme in that report, which has also been echoed in statements of policy advisors in Canada and elsewhere, is that the interconnectedness of issues across public policy domains needs to be recognized and that in particular the social antecedents and outcomes of economic performance need to be kept in view. The report states that "Health care, crime, and educational achievement may all be social issues, but they have an important economic bottom line." Similarly, "growth" issues of employment, productivity and competitiveness each contribute to social well-being and societal stability. Investigation of the hybrid nature or cross-over characteristics of policy issues (e.g. equity vs. efficiency) has sometimes been hampered by the natural tendency to label issues or restrict inquiry along well-established disciplinary paths.

It is on this basis of shared concern and interest about social aspects of growth and well-being that the OECD and Human Resources Development Canada (HRDC) agreed to cooperate in the organization of an international symposium of experts in Québec City from March 19 to 21, 2000. At this symposium, experts and policy advisors explored how human capital and other types of social assets – including what has come to be known as social capital – may contribute to growth and well-being. The symposium achieved several specific milestones:

- It brought together a number of different perspectives and disciplines in the analysis of the contribution of human and social capital to economic growth, productivity, social cohesion and human well-being.
- The symposium situated the discussion of economic growth in a wider social context. It highlighted the various human and social antecedents of growth as well as the broad "market" and "non-market" social returns to investment in learning and social capital.
- It clarified concepts and relationships in the area of human and social capital and considered the role of public authorities in areas such as learning, social programs and labour market responsibility.
- It provided directions for further analytical work and data development to gauge more precisely the importance of social antecedents for growth and well-being.

This book assembles all the papers and commentaries that were presented at the symposium. All of the contributions have been reviewed by the authors on the basis of comments and discussions at the symposium and recommendations by Professor John Helliwell, the editor of this volume, in the months following the symposium. The introduction and the rapporteur's summary, both prepared by John Helliwell, present an overview of the main issues of the symposium.

As hosts of this symposium, we extend our thanks to the authors of the contributions collected in this book. The quality of the presentations warrants the overall quality of this book and its usefulness to anyone interested in the role of human capital and social capital for well-being. We owe special thanks to John Helliwell who supported this project early on and accepted the challenging tasks of reviewing the issues and contributions at the symposium and of editing the proceedings. We also thank the attendees to the symposium who were invited to participate actively in the discussions and therefore participated to shape the content of this book.

Great thanks are due to those who initiated and made this project happen, Tom Alexander and Tom Healy at the OECD, and Jean-Pierre Voyer and Richard Roy at HRDC. Many talented people were actively involved in the actual preparation of this international symposium and we are grateful to them all. Special thanks are due to Marie Lavoie and Pierre Therrien at HRDC, and Sylvain Côté and Christina Purcell at the OECD for their diligence. Finally, many thanks are owed to Thérèse Laflèche at HRDC and Aneta Bonikowska at the University of British Columbia for their editorial expertise. Bringing together the various contributions into one coherent volume was also facilitated by Jean Noël and Julie Doucet from the Applied Research Branch of HRDC.

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Introduction

John F. Helliwell

This book records the proceedings of a joint HRDC/OECD symposium on the effects of human and social capital held in Quebec City in March 2000. There were five sessions at the symposium, and this book follows the same layout. The first session was a brief welcome by the symposium sponsors. The next three sessions each started with a keynote address, followed by several papers, comments by designated discussants and general discussion. The fifth section contains the rapporteur's attempt to summarize the papers, comments and general discussions in each of the three principal sessions, followed by a review of the main common threads of the papers and discussions. The Appendix contains a background survey of some of the relevant empirical literature, as prepared by Jon Temple. This introduction will try to set the stage in a way that might help the reader to interpret the issues. It will not go through the papers one by one, since this is done in the rapporteur's report.

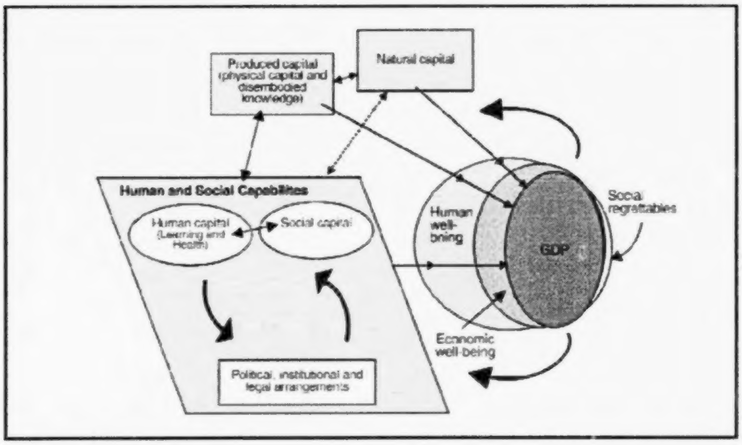
Session 2 of the symposium, and the corresponding part of this book, dealt generally with the conceptual framework for interpreting the contributions of human and social capital to sustained economic growth and well-being. Since this introduction is being written well after the symposium took place, it is now possible to provide a framework that takes advantage of the many insights in the symposium papers and comments. It is also possible to build on post-symposium discussions among some of the participants, including especially those at a meeting held at the OECD July 20-21, 2000. The symposium organizers invited the participants to consider the effects of human and social capital on sustained economic growth and well-being.

This demands first a clear understanding of what is meant by human and social capital, as was provided initially in Session 2, but supplemented and refined throughout the symposium and after. In the remaining sessions of the symposium, attention was focussed first on the empirical evidence of the effects of social and human capital on economic growth and well-being, and then on a range of measurement and policy issues. It will be clear from reading the papers that there is no unique ordering of questions and issues from start to finish of the volume. The interdependencies are complex enough, and the research results flow from a wide enough range of scholars and disciplines, that it is too early to expect a single story line to emerge. There is a flavour in these papers and discussion of exploration, and of attempts to build empirical and methodological bridges across quite different topics and research results.

To place the papers and discussions of this symposium into the wider context of sustainable economic growth and well-being, Figure 1 sketches one way of setting the stage. Well-being is seen as the broad objective of human activity and public policies, and within it is nested the narrower concept of economic welfare. Conventionally measured Gross Domestic Product (GDP) is represented by an area that is mostly contained within the spaces for well-being. That part of GDP which does not contribute to well-being contains the "regrettable" parts of GDP described by Osberg and Sharpe, including, among other items, the costs of combatting crime and the repair of environmental damage, as discussed by Rod Dobell. It is simplest to think of well-being as representing a flow of current enjoyment or satisfaction, plus the provisions being made currently to provide for future well-being. For current levels of well-being to be sustainable requires that these provisions be large enough, and suitably directed, so that future generations will be able to enjoy equal or greater levels of well-being.

Figure 1

Setting human and social capital into the wider context of sustainable economic growth and well-being


Produced capital (physical capital and disembodied knowledge)
Natural capital
Human and Social Capabilites
Human capital (Learning and Health)
Social capital
Political, institutional and legal arrangements
Human well-bning
GDP
Social regrattables
Economic well-being

What are the important stocks of resources available to contribute to well-being? To show clearly the issues of this symposium, it is helpful to consider at least five different stocks of assets supporting well-being: natural capital, produced or physical capital (including buildings, equipment and other hardware, software and the stock of accumulated knowledge), human capital embodied in individuals (including accumulated learning and health), social capital (comprising the norms and networks that facilitate joint and other collaborative actions), and a final composite category containing public and private institutions and social arrangements (including the political and legal systems in all their detail). Each of these categories is, or could easily be described as, a stock, or as a capital stock, to emphasize that it takes time and effort to build and maintain, and can contribute directly or indirectly, or both, to well-being.

It may be a matter of taste whether health is considered as a component of human capital, as it is in Figure 1, or is represented in a separate box, with human capital then left to represent the accumulated product, insofar as it resides in individuals, of formal and informal education. Most of the papers dealing directly with human capital in this volume focus on education and its effects, implicitly treating education as the main component of human capital, with health only entering the picture through its very important two-way linkages with education. But that reflects more the way the conference was organized than any judgement about the relative importance of health as a determinant of well-being. Indeed, the important two-way channels between health and education, and between health and social capital, were the focus of much of the research surveyed in conference papers. In addition, most subjective measures of well-being place a high direct value on good health, beyond its indirect contributions through economic performance and social capital.

The use of a box for social capital that is separate from the box for institutions reflects the fairly complete symposium consensus in favour of using a "lean and mean" definition of social capital. This definition turns the spotlight on norms and networks. This was advocated by Woolcock, Putnam and others as being more consistent with established sociological usage, and as being relatively easy to apply empirically. It also embodies a distinction between "bonding" and "bridging" social capital, with the former usually having a smaller horizontal span, and generally grouping individuals (e.g. family members) with many common interests. Woolcock adds the notion of "linking" social capital, which links people or groups at different levels in hierarchies, leaving the "bridging" notion to have a relative concentration on broad radius horizontal linkages. If this definition of social capital is adopted, there has to be another way to recognize the importance of well-functioning institutions, many of which have been regarded by some scholars as part of social capital.

Figure 1 recognizes the importance of institutions, but via a separate box rather than by inclusion in a broad definition of social capital. But what about trust and social cohesion, both of which have been central to discussions of social capital, within this symposium and beyond? For example, Jo Ritzen argues in his paper for a broader definition of social capital, and for the use of "social cohesion" as a title to be preferred to "social capital," mainly on the grounds that social cohesion is a term more likely to resonate in political and community circles. Several papers, including those by Knack and Putnam, treat trust as a part of social capital, or at least as a proxy measure for social capital. Where are trust and social cohesion to be included in Figure 1? My preference is to accept the "lean and mean" definition of social capital, and then to treat both trust and social cohesion as immediate consequences of those types of social capital that are most conducive to well-being. It is especially important to include trust in the pathway from norms and networks to well-being, since most of the empirical work reported in the papers for this symposium found stronger effects from measures of trust than from measures of networks based, for example, on memberships and social activities. It is also important to recognize, as is done in several of the symposium papers, that levels of interpersonal trust depend on much more than the types of linkage implied by the lean and mean definitions of social capital. There are probably direct routes from education to trust, and trust and social cohesion surely depend also on the quality of the institutions and legal arrangements that support individual and community life. And many students of trust have shown that history matters, a lot.

In trying to draw parallels between the discussions on education and social capital, I suggest in the symposium summary that trust, at least of the wide-radius interpersonal sort, could be regarded as a result of the right sorts of social capital, just as test scores for numeracy and literacy are used as measures of the beneficial results of education. There was a fair amount of discussion at this symposium, as in other meetings, of the possibility that some networks are set up on exclusionary principles, and others are set up for criminal and other anti-social purposes. See in particular, on this score, Putnam's discussion of bomb plots hatched while bowling, and Knack's attempts to separate associations into types more and less likely to facilitate economic growth and broad social relations.

There was widespread agreement at this symposium that the "lean and mean" social capital definition does not, and should not, exclude the possibility of malign networks. In this case, researchers may be interested in having some way, in principle, of measuring the value of social capital (i.e. the extent to which the good types are more pervasive than the bad types). Of course society has many objectives, and networks are instrumental, as well as valued in their own right, so that almost any network will have good consequences for some, while being less good, or possibly detrimental, for others. Trust can reasonably be regarded as a net measure of the value of networks, since those that are divisive or dangerous are likely to reduce general levels of wide-radius trust, while denser networks of better sorts are likely to engender trust (as well as being themselves favoured by a climate of trust, it must be pointed out right at the start).

Perhaps social cohesion could also be seen as lying intermediate between the boxes, including most importantly social capital, and the various types of well-being. This may be more problematic, as social cohesion, like the narrower definition of social capital, may have good and bad types and consequences, depending on the nature and radius of the cohesion. The analogy between educational test scores and trust does not extend so readily to social cohesion, since the latter is less subject to agreed definitions and standard measurements. But some intermediate position between the boxes and well-being seems to me the right place to put what Ritzen describes as social cohesion.

Figure 1 is not littered with arrows linking all the different contributors to GDP and well-being, but that is just to avoid confusion. Many of the papers and much of the discussion illustrated rich and complex linkages, so that the absence of arrows reflects artistic preference rather than absence of interdependence. For example, Putnam's paper and book document many relations among health, social capital and education, with the latter, at the individual and community levels, being the most consistently important predictor of social capital. Many studies show positive linkages and feedbacks from health to both education and social capital.

What of the pathways from the boxes to GDP and wider measures of well-being? While much of the traditional quantitative literature on human capital concentrates on the rates of return to schooling, many of the studies surveyed here by Wolfe and Haveman, and others presented by McMahon, show that education has strong effects on health and social capital, which in turn make positive contributions to GDP. But most of these indirect effects are appropriately captured by taking account of the interdependence among health, education and social capital, and then having a direct link down from each to GDP. But there are many other studies, including the self-assessed life satisfaction results reported in Putnam's paper, showing very strong direct effects flowing from health, education and social capital directly to well-being, above and beyond their positive roles in contributing to well-being through increased GDP per capita. This can be represented by thick arrows running from each box to overall well-being, with smaller arrows running through to economic well-being and GDP.

Similar relations hold for natural capital, produced capital and institutions, although the linkages between human and social capital, and from both to various measures of well-being, are the primary focus of this volume. The evidence used relates sometimes to individuals and sometimes to neighbourhoods and to sequentially larger political jurisdictions, usually stopping at national borders. Dobell's paper provides something of an exception to both these generalizations by demonstrating the importance of social capital, of bonding and bridging types, in creating and complicating the scope for environmental reforms. He also mentions the need for more analysis of social capital with an international span, which has a parallel in Willms's stress on the importance of taking distance into account when assessing the strength of spillovers.

In reviewing once again this diverse selection of interesting papers, I am struck by some key points that reappear in several places, and invite additional research. First, the direct effects of both social and human capital on well-being may be as great or greater than their instrumental roles acting through economic activity. Second, as emphasized by both Putnam and Willms, it is important to account simultaneously for individual-level and community-level measures of human and social capital. The tentative Putnam finding – from equations including both individual- and community-level data, that community levels of human and social capital appear to increase happiness, while the reverse is true for income – suggests that returns from human and social capital are far broader than whatever positive effects they may have on material standards of living. The same might well be true of physical health, which was not covered in Putnam's data, but does play a large role in the well-being literature. Thus, education and social capital, and probably good health as well, have a triple payoff. First, at the individual level they have a direct economic payoff. Second, and also at the individual level, they have, in addition to their effects on income, a direct positive effect on individual happiness. Third, higher community levels of social and human capital, but not of incomes, also increase the extent to which individuals feel happy about their lives. More research is required to establish the strength and relative size of these linkages in different national contexts before their implications for policy can be clearly drawn. Should the results be confirmed, their broad implications are clear: the likelihood of greater positive externalities from human and social capital, relative to further increases in incomes, would imply increasing relative efforts to build and maintain stocks of human and social capital.

Finally, more attention needs to be focussed on the links between social capital and governance. In many countries, trust in governments has dropped relative to interpersonal trust, suggesting that governments may need to re-establish their own credibility before they can successfully implement policies that foster sustainable well-being. Dobell's paper illustrates some of the complexities of national and international governance in a world of diverse and overlapping interests. What is needed are further studies of the causes and consequences of declining trust in government, so as to permit a clearer analysis of what sorts of changes might help to make policies more responsive to the needs of diverse constituencies.

The papers in this volume provide solid reviews of existing knowledge, present many new results, and stake out appealing directions for further research. There remains much to be discovered about the linkages between human and social capital and sustained economic growth and well-being. Thus, these papers cannot provide the last word, but they are generally the latest words, and expose many intriguing paths to follow. We hope that readers share the editors' gratitude to the authors and to the organizers of this symposium.

Part 1
The Policy Context

1

A Canadian Policy Perspective on Investment in Human and Social Capital

Avrim Lazar

Policy discussions around what makes countries grow and enjoy high standards of living have traditionally taken as a point of departure an investigation of which type of economic policy is more likely to foster physical capital accumulation. Social policies, if mentioned at all, have usually appeared under the rubric dealing with the identification and removal of barriers to growth. If not identified as barriers to growth, social policies are often ranked as a second order preoccupation, an issue to deal with once the proper foundations of economic growth have been established. Those, I suggest, represent short-sighted views of the economic growth process, not to mention that they are based on very poor understandings of the fabric of modern societies. Good social policies and programs are necessary ingredients to economic growth, increased living standards and well-being.[1]

In Canada, an interdepartmental committee of the Policy Research Initiative of the federal government has recently embarked on more analysis and discussions of the relationships that link economic growth, productivity, social policies and social infrastructures. The emphasis will be placed on understanding the role of social infrastructures governing relations among individuals such as the legal and political system, the industrial relations system and the mutual trust individuals share as they engage in productive activities. More specifically, efforts will be made to better understand the social antecedents of economic growth and well-being. This symposium of international experts, organized jointly by the OECD and HRDC, is part of this policy research agenda in Canada. I am glad to host this symposium of experts and would like to welcome you in Québec City.

Speaking to you as a non-expert in human or social capital and being Assistant Deputy Minister for social policy in Canada, I thought my best strategy would be to speak to you as a client: a policy advisor who needs answers from the experts.

My experience in policy is that, having your answers listened to, really will depend less upon the quality of the answers and more upon whether you provide them at the right time and to the right people. There are four things that determine whether or not your expert answers would be heard. The first is timing, the second is whether or not it contradicts the listener's beliefs, the third is whether or not it answers the listener's bewilderment and perhaps most importantly, whether it responds to the policy maker's hopes. So, for a few minutes, I want to share with you what my thoughts are on timing, beliefs, bewilderment and hopes as a policy maker waiting for the results of your symposium.

Your timing is excellent for several reasons. One is that across the industrialized and developing world there are a few big questions about social and human capital that are being asked everywhere. One of these questions is that not everyone can participate in the knowledge-based economy and some people are left behind, they are excluded from economic and social participation. What should governments do for these people? Should governments promote more investment in human capital for these excluded? A related question is whether or not we are investing too much in education and training? There are those who would say that the economies that are doing well today are not doing well because of their investment in human capital, but despite their investment. They would prefer to talk about reducing taxes, reducing how much is spent on both human capital and social capital. The issue is how much is enough and where does efficiency compete with equity and whether or not we can afford to draw down social capital. It is a particularly difficult question because we may not see the effects of diminishing social capital until it is too late. You cannot go back and re-educate, you cannot go back and re-establish a health system, you cannot go back and re-establish social cohesion after you have cut the programs and after the effects have run their course. So, to rephrase my request, one of the key questions for which an answer is urgently needed is whether we have succeeded economically despite having invested in social infrastructure or because of these social investments. This issue, I understand, will be considered very explicitly in the third session of this symposium.

Another reason why your timing is right is that we are at a period in history in which someone is almost ready to listen to answers based on evidence. Probably over the last 30 years, what was most interesting in answering these questions was ideology. You're either from the left or from the right. And if you're from the left, then government investment was good and if you're from the right, it was bad. Of course, there are many nuances and subtleties to all this, but there was more name calling than discussion and more righteousness than reflectiveness. But we are now actually at a period in which there is an unprecedented openness to asking the question of "what actually works?"

Let me now talk about "beliefs." In the policy world, there are some things which are pretty well taken for granted. One is that, of course, human capital is important to economic growth and where some of you may find ways of proving this, you will excuse us if we are not astonished. It is also pretty widely accepted that social capital is as important as human capital. People do not exist in a vacuum, people are like buffaloes or like wolves, we live in social context and any examination of competencies or skills outside of social context probably is not all that interesting. The third assumption, which you can find among most policy types is that social policy and economic policy are really the same thing. This assumption is not said all the time, but there are very few people who would pretend that economic policy does not have a profound impact on social outcomes or that social policy does not have a profound impact on economic outcomes. Of course there are various perspectives. You could say too much spending on equity interferes with efficiency or you could say the wrong sort of economic growth interferes with well-being. However, there are very few who would quarrel with the fact that it is in fact one system, and the only real question is how do we get to understand the whole system.

Where are the "bewilderments," where are policy advisors totally confused? The first area is how and where to target social investments. Should we put more money in early child development? Should we spend more money trying to get older workers back into the workforce or should we just pension them off? How do you invest so that your workforce is more adaptable? What should be the balance between investing in individuals and investing in communities? Between investing in technical skills and investing in innovation and communication skills? The second area of bewilderment is what actually works? Even if you know where your most leveraged investment would be, where to target, there is a great deal of uncertainty about what actually works. What would be worth doing? What sort of interventions will have the desired effects? There is a tendency across almost all governments to base the allocation of expenditure on the current immediate needs of people and not on whether or not the expenditure will change the basic conditions giving rise to these needs. In other words, spending is not oriented enough toward investment expenditures. A third area of bewilderment is about the increasing inequality trends. Many in the policy world look with some wonderment at what is happening for example in the US and, to a lesser extent, in some other OECD countries where the economies are growing but social equity is decreasing. How sustainable are these trends? Can you continue to grow as an economy while leaving a significant portion of the population behind, or will we find in 10 or 15 years that this is not a sustainable model of growth? I do not think anyone knows the answer to that question. Some are betting one way, others are betting the other way. But if we are thinking about long-term policy and about investment in social capital, the question of the sustainability of models of the economic growth must be at the forefront of the debate.

Finally, if you are trying to give answers you also have to address the question of "hopes." What are the hopes of the policy community? The wildest hope, I argue, is for the development of an integrated approach to policy, the making of a general theory of social and economic interventions. We know that for heuristic reasons disciplines have to find some ways of separating themselves, but for practical reasons we have to find a way of reintegrating them, and in this context it might be time to start switching independent and dependent variables. For example, some academics assume that social investment is the independent variable and economic growth is the dependent variable. But it might be time to start asking the question of what sort of models of economic growth produce what sort of social consequences? There is a rather astonishing phenomenon of believing that it is possible to grow as an economy outside of a social commons. The idea is that you can live in gated communities, go to wherever you can get the best deal for your factory, do your banking in an international atmosphere and not really depend upon the social commons, the social fabric, the social cohesion of any one society. And one of the questions I would hope you would address over the next few days is whether or not the economy can exist independent of the social fabric of the countries in which the economy is growing.

I will leave you on these thoughts but before passing the floor to Mr. Moe from the OECD, and co-sponsor of the symposium, let me again wish everyone a productive and fruitful coming two days.

Note

[1] I presented in some details the main arguments in favour of social policies in "Good Social Policy Can Foster Growth and Productivity," *Horizons, Policy Research Initiative* 1999: 2(1).

2

An International Policy Perspective on Investment in Human and Social Capital

Thorvald Moe

This symposium – organized in collaboration by HRDC and OECD – is part of a broader effort undertaken by the OECD to study the causes of growth disparities across countries and to identify evidence of fundamental departures from past trends (i.e. the possible emergence of a "new economy paradigm"). The main orientations of this work are:

- a focus on the causes of economy-wide growth
- a framework to account, in an integrated and consistent way, for past and recent economic developments
- an emphasis on those determinants of economic growth that are more amenable to policy actions
- an investigation of the micro-economic sources of economic growth at the level of individual enterprises.

Within this investigation of the determinants of economic growth is the assessment of the role of human and social capital. Evidence from this workshop and from the OECD Growth project more generally will be reported to Ministers in 2001. But before focussing on human and social capital, let me mention another important and related strand of OECD work that I see as highly relevant for our symposium discussion, our work on sustainable development.

It is well known that Gross Domestic Product (GDP) is an imperfect measure of material welfare, and that human capital, social conditions and the state of the environment are all important components of overall welfare. Underlying the concept of sustainable development is the idea that human well-being should not decline over time which requires maintenance of resources (human-made capital, natural and environmental capital, human and social capital) on which it is based.[1] While enhancing our understanding of the "drivers" of economic development, we must also better assess its "consequences" – consequences for the environment, but also for the human and social fabric of our societies. Economic growth may not last if it restricts opportunities for future generations (e.g. climate change) or if large numbers of individuals cannot benefit from it. In other words, economic growth should be regarded as a means rather than an end in itself, and policy makers need to recognize the comprehensive nature of the development challenge. Work is ongoing in the OECD for the preparation of documentation for the OECD Ministerial Council on policy options to make economic development more sustainable.[2]

Let me now come to the specific theme of this symposium. Human capital is by now well established as a fundamental driver of economic growth. We have a good understanding of how it accumulates and decays over time; of the variety of forms and settings in which it is provided (formal education and training); of the returns for the individual that it generates. The OECD published in 1998 an important contribution on human capital (OECD 1998),[3] in response to a Ministerial mandate in 1996, and it is in the lead today in developing and implementing survey-based measures of "competencies" for both students and (to a lesser extent) adults. Moving from indirect measures of inputs (expenditure) to direct measures of results is a crucial step. This "human capital" agenda was stressed by an informal Forum of OECD Education Ministers in Copenhagen just one week ago. But other important challenges in the measurement of human capital remain, including a better understanding of some "non-economic" returns from human capital for quality of life and social cohesion. Results in some of the papers at this workshop suggest that these returns (e.g. the effects of parental education attainment on that of children) may be as large as the returns to education accruing to individuals. A better understanding of their nature and magnitude has an obvious importance for determining the best level of investment in human capital.

The challenges are somewhat different when considering social capital. In recent years, social capital has been very successful in helping to draw policy attention to the importance of social arrangements for economic efficiency and economic growth, and for mainstreaming into economic discourse a range of insights provided by other disciplines. Arguments about declining levels of social capital in some OECD countries are also suggestive of a pattern that mirrors the declining natural capital which motivates the agenda on environmental sustainability. But we have still to prove the value of the "capital" analogy by better identifying the process of formation and the effects of social capital, and how we measure the matching investments, depreciation and returns, both economic and non-economic. Work on social capital is still in its early stages and its policy implications are not yet fully spelled out. But, as noted in the background paper by Temple, this is not different from the introduction of human capital into economics, a concept that in its early stages seemed too ethereal and with few immediate implications for educational policies. My hope is that, by better understanding the sources and functions of social capital, we will leave our successors better prepared to make economic growth more socially sustainable.

The challenge is to understand better the inter-relations, the evidence for various impacts and the possible policy levers. The OECD welcomes the opportunity to discuss these issues with a range of experts in cooperation with HRDC. We thank the Canadian authorities for hosting this international symposium, and expect it to be an important input to our work on both the sources of economic development, and on how to make it socially sustainable over the medium and longer term.

Notes

[1] I will not go into the debate on weak versus strong sustainability.

[2] While the economic/environmental interface of development is fairly well documented over the last decade, the relationships between sustainable development, human capital and social conditions are – surprisingly – much less developed.

Reference

OECD. 1998. *Human Capital Investment – An International Comparison.* Paris: Centre for Educational Research and Innovation.

Part 2

Sorting Out the Conceptual Framework

3

Education and Economic Growth[1]

Robert J. Barro

Since the late 1980s, much of the attention of macro-economists has focussed on long-term issues, notably the effects of government policies on the long-term rate of economic growth. This emphasis reflects the recognition that the difference between prosperity and poverty for a country depends on how fast it grows over the long term. Although standard macro-economic policies are important for growth, other aspects of "policy" – broadly interpreted to encompass all government activities that matter for economic performance – are even more significant.

This paper focusses on human capital as a determinant of economic growth. Although human capital includes education, health and aspects of "social capital," the main focus of the present study is on education. The analysis stresses the distinction between the quantity of education – measured by years of attainment at various levels, and the quality – gauged by scores on internationally comparable examinations.

The recognition that the determinants of long-term economic growth were the central macro-economic problem was fortunately accompanied in the late 1980s by important advances in the theory of economic growth. This period featured the development of "endogenous-growth" models, in which the long-term rate of growth was determined within the model. A key feature of these models is a theory of technological progress, viewed as a process whereby purposeful research and application lead over time to new and better products and methods of production and to the adoption of superior technologies that were developed in other countries or sectors. One major contributor in this area is Romer (1990).

Shortly thereafter, in the early 1990s, there was a good deal of empirical estimation of growth models using cross-country and cross-regional data. This empirical work was, in some sense, inspired by the excitement of the endogenous-growth theories. However, the framework for the applied work owed more to the older, neoclassical model, which was developed in the 1950s and 1960s (see Solow 1956, Cass 1965, Koopmans 1965, the earlier model of Ramsey 1928, and the exposition in Barro and Sala-i-Martin 1995). The framework used in recent empirical studies combines basic features of the neoclassical model – especially the convergence force whereby poor economies tend to catch up to rich ones – with extensions that emphasize government policies and institutions and the accumulation of human capital. For an overview of this framework and the recent empirical work on growth, see Barro (1997).

The recent endogenous-growth models are useful for understanding why advanced economies – and the world as a whole – can continue to grow in the long run despite the workings of diminishing returns in the accumulation of physical and human capital. In contrast, the extended neoclassical framework does well as a vehicle for understanding relative growth rates across countries, for example, for assessing why South Korea grew much faster than the US or Zaire over the last 30 years. Thus, overall, the new and old theories are more complementary than they are competing.

Framework for the Empirical Analysis of Growth

The empirical framework derived from the extended neoclassical growth model can be summarized by a simple equation:

$$Dy = F(y, y^*) \tag{1}$$

where Dy is the growth rate of per capita output, y is the current level of per capita output, and y^* is the long-run or target level of per capita output. In the neoclassical model, the diminishing returns to the accumulation of capital imply that an economy's growth rate, Dy, is inversely related to its level of development, as represented by y. In Eq. 1, this property applies in a conditional sense, that is, for a given value of y^*. This conditioning is important because the variables y and y^* tend to be strongly positively correlated across countries. That is, countries that are observed to be rich (high y) tend also to be those that have high long-run target levels of per capita output (high y^*).

In a setting that includes human capital and technological change, the variable y would be generalized from the level of per capita product to encompass the levels of physical and human capital and other durable inputs to the production process. These inputs include the ideas that underlie an economy's technology. In some theories, the growth rate, Dy, falls with a higher starting level of overall capital per person but rises with the ratio of human to physical capital.

For a given value of y, the growth rate, Dy, rises with y^*. The value y^* depends, in turn, on government policies and institutions and on the character of the national population. For example, better enforcement of property rights and fewer market distortions tend to raise y^* and, hence, increase Dy for given y. Similarly, if people are willing to work and save more and have fewer children, then y^* increases, and Dy rises accordingly for given y. In practice, the determinants of y^* tend to be highly persistent over time. For example, if a country maintains strong institutions and policies today, then it is likely also to maintain these tomorrow.

In this model, a permanent improvement in some government policy initially raises the growth rate, Dy, and then raises the level of per capita output, y, gradually over time. As output rises, the workings of diminishing returns eventually restore the growth rate, Dy, to a value consistent with the long-run rate of technological progress (which is determined outside of the model in the standard neoclassical framework). Hence, in the very long run, the impact of improved policy is on the level of per capita output, not its growth rate. But since the transitions to the long run tend empirically to be lengthy, the growth effects from shifts in government policies persist for a long time.

Empirical Findings on Growth and Investment Across Countries

Empirical Framework

The findings on economic growth reported in Barro (1997) provide estimates for the effects of a number of government policies and other variables. That study applied to roughly 100 countries observed from 1960 to 1990. The sample has now been extended to 1995 and has been modified in other respects, as detailed below.

The framework includes countries at vastly different levels of economic development, and places are excluded only because of missing data. The attractive feature of this broad sample is that it encompasses great variation in the policies and other variables that are to be evaluated. In fact, my view is that it is impossible to use the experience of one or a few countries to get an accurate empirical assessment of the long-term growth effects from legal and educational institutions, size of government, monetary and fiscal policies, and other variables.

There are a number of drawbacks from using the full sample with its great heterogeneity of experience. One problem involves the measurement of variables in a consistent and accurate way across countries and over time. Less developed countries tend, in particular, to have a lot of measurement error in national accounts and other data. In addition, it may be difficult to implement functional forms for models of economic growth that work satisfactorily over a wide range of economic development. Given these problems, the use of the broad panel relies on the idea that the strong signal from the diversity of the experience dominates the noise. To get some perspective on this issue, the empirical analysis includes a comparison of results from the broad country panel with those obtainable from sub-sets of rich or OECD countries.[2]

The other empirical issue, which is likely to be more important than measurement error, is the sorting out of directions of causation. The objective is to isolate the effects of alternative government policies on long-term growth. But, in practice, much of the government's behaviour – including its monetary and fiscal policies and its political stability – is a reaction to economic events. For most of the empirical results, the labelling of directions of causation depends on timing evidence, whereby earlier values of the explanatory variables are thought to influence subsequent economic performance. However, this approach to determining causation is not always valid.

The empirical work considers average growth rates and average ratios of investment to Gross Domestic Product (GDP) over three decades, 1965–75, 1975–85, and 1985–95.[3] In one respect, this long-term context is forced by the data, because many of the determining variables considered, such as school attainment and fertility, are measured at best over five-year intervals. Data on internationally comparable test scores are available for even fewer years. The low-frequency context accords, in any event, with the underlying theories of growth, which do not attempt to explain short-run business fluctuations. In these theories, the exact timing of response (e.g. of the rate of economic growth to a change in a public institution) is not as clearly specified as the long-run response. Therefore, the application of the theories to annual or other high-frequency observations would compound the measurement error in the data by emphasizing errors related to the timing of relationships.

Table 1 shows panel regression estimates for the determination of the growth rate of real per capita GDP.[4] Table 2 shows parallel estimates for the determination of the ratio of investment (private plus public) to GDP. Estimation is by three-stage least squares, using lags of the independent variables as instruments (see the notes to Tables 1 and 2 for details). In each case, the observations are equally weighted (i.e. larger countries do not receive a higher weight in the estimation).

Table 1

Panel regressions for growth rate

Independent variable	Overall sample		OECD sample	Rich-country sample	Poor-country sample	Wald tests of coefficients
	(1)	(2)	(3)	(4)	(5)	(6)
Log(per capita GDP)	0.107 (0.025)	-0.0244 (0.0031)	-0.0340 (0.0036)	-0.0343 (0.0033)	-0.0190 (0.0042)	0.017
Log(per capita GDP) squared	-0.0084 (0.0016)	—	—	—	—	—

Table 1 (cont'd)

Independent variable	**Overall sample**		**OECD sample**	**Rich-country sample**	**Poor-country sample**	**Wald tests of coefficients**
	(1)	(2)	(3)	(4)	(5)	(6)
Male upper school	0.0044 (0.0018)	0.0025 (0.0019)	0.0000 (0.0010)	0.0023 (0.0012)	0.0084 (0.0040)	0.12
Govt. consumption/GDP	-0.157 (0.022)	-0.155 (0.025)	0.015 (0.040)	-0.014 (0.042)	-0.167 (0.030)	0.044
Rule-of-law index	0.0138 (0.0056)	0.0074 (0.0062)	0.0115 (0.0113)	0.0116 (0.0058)	0.0196 (0.0089)	0.54
Openness ratio	0.133 (0.041)	0.0172 (0.0047)	0.0148 (0.0071)	0.0112 (0.0028)	0.0361 (0.0114)	0.017
(Openness ratio)* log(GDP)	-0.0142 (0.0048)	—	—	—	—	—
Inflation rate	-0.0137 (0.0090)	-0.0057 (0.0094)	-0.0228 (0.0210)	-0.0051 (0.0088)	0.0033 (0.0123)	0.44
Log(total fertility rate)	-0.0275 (0.0050)	-0.0257 (0.0056)	-0.0209 (0.0059)	-0.0174 (0.0051)	-0.0212 (0.0089)	0.76
Investment/ GDP	0.033 (0.026)	0.067 (0.027)	0.045 (0.025)	0.029 (0.025)	0.053 (0.040)	0.47
Growth rate of terms of trade	0.110 (0.030)	0.103 (0.029)	-0.010 (0.056)	-0.008 (0.042)	0.134 (0.039)	0.040
Numbers of observations	81, 84, 81	81, 84, 81	23, 23, 23	32, 32, 31	49, 52, 50	—
R^2	0.62, 0.50, 0.47	0.47, 0.42, 0.41	0.85, -0.65, 0.50	0.77, 0.62, 0.52	0.48, 0.39, 0.44	—

Notes:

Dependent variables: The dependent variable is the growth rate of real per capita GDP. The growth rate is the average for each of the three periods 1965–75, 1975–85 and 1985–95.

Independent variables: Individual constants (not shown) are included in each panel for each period. The log of real per capita GDP and the average years of school attainment for males aged 25 or over at the upper level (secondary and higher) are measured at the beginning of each period. Government consumption is measured exclusively of spending on education and defence. The openness ratio is the ratio of exports plus imports to GDP, filtered for the usual relation of this ratio to country size, as measured by the logs of land area and population. The government consumption ratio, the openness ratio, the ratio of investment (private plus public) to GDP, the inflation rate (for consumer prices), the total fertility rate and the growth rate of the terms of trade (export over import prices) are period averages. (For the last period, the government and investment ratios are for 1985–92.) The variable openness ratio*log(GDP) is the openness ratio multiplied by the log of per capita GDP at the start of the period. The rule-of-law index is the earliest value available (for 1982 or 1985) in the first two equations and the period average for the third equation.

Estimation is by three-stage least squares. Instruments are the actual values of the schooling, openness and terms-of-trade variables, and lagged values of the other variables. The earliest value available for the rule-of-law index (for 1982 or 1985) is included as an instrument for the first two equations, and the 1985 value is included for the third equation.

Standard errors are shown in parentheses. The R^2 values apply to each period separately. P-values from Wald tests, shown in column 6, are for tests of the hypothesis of equality for the respective coefficients shown in columns 4 and 5.

In the baseline system shown in column 1 of Table 1, the effects of the starting level of real per capita GDP show up in the estimated coefficients on the level and square of log(GDP). The other regressors include an array of policy variables – the ratio of government consumption to GDP, a subjective index of the maintenance of the rule of law, a measure of international openness, and the rate of inflation (based on consumer price indexes). Also included are the total fertility rate, the ratio of investment to GDP, and the growth rate of the terms of trade (export prices relative to import prices).

Education Data

The education variable contained in the baseline regression system is one that I found previously had significant explanatory power for economic growth. This variable is the value at the start of each period of the average years of school attainment at the upper (secondary and tertiary) levels for males aged 25 or over. The subsequent analysis considers several alternative measures of the quantity and quality of education: primary school attainment, attainment of females and results on internationally comparable examinations. The analysis also evaluates measures of health status, another dimension of human capital, as determinants of growth and investment.

The construction of the school-attainment data is discussed in Barro and Lee (1993, 1996). The basic procedure was to begin with census figures on educational attainment. These data were compiled primarily by the United Nations. Missing observations were filled in by using school-enrolment data – effectively, enrolment is the investment flow that connects the stock of attainment to subsequent stocks. The resulting data set included information for most countries on school attainment at various levels over five-year intervals from 1960 to 1990.

The data set has recently been revised and updated; see Barro and Lee (2000) for details. The new data set includes actual figures for 1995 and projections to 2000. The fill-in part of the computational procedure has also been improved. One revision is to use gross enrolment figures (enrolment for students of all ages at a given level of schooling) adjusted to delete class repeaters, rather than either gross figures (which overstate schooling rates because of repeaters) or net figures (which consider only students of the customary age for each level of schooling). The problem with the net figures is that they create errors when students start school at ages either earlier or later than the customary ones. Another revision is that we now consider changes over time in a country's typical duration of each level of education.

Puzzling discrepancies exist between our data, based primarily on UN sources, and the figures provided by the OECD for some of the OECD countries (see OECD 1997, 1998a, 1998b). Table 2 compares our data (denoted Barro-Lee) with those provided by the OECD for OECD and some developing countries. The table shows the distribution of highest levels of school attainment among the adult population in recent years – 1995 for our data and 1997 or 1998 for the OECD (1996 for their data on the developing countries).

One difference is that our figures cover the standard UNESCO categories of no schooling, primary schooling, some secondary schooling, complete secondary schooling, and tertiary schooling.[5] We then compute average years of schooling at all levels by multiplying the percentages of the population at each level of schooling by the country's average duration of school at that level.

The OECD categories are below upper secondary, upper secondary and tertiary. We believe that the first OECD category would correspond roughly to the sum of our first three categories. However, this approximation is satisfactory only if the OECD's concept of upper secondary attainment corresponds closely to the UN concept of complete secondary attainment. The OECD also reports figures on average years of schooling at all levels, but we are uncertain about how these numbers were calculated.

For many countries, the correspondence between the Barro-Lee and the OECD data is good. But, for several countries, the OECD data indicate much higher attainment at the upper secondary level and above – Austria, Canada, Czech Republic, France, Germany, Netherlands, Norway, Switzerland and the UK. The source of the difference, in many cases, is likely to be the distinction between some and complete secondary schooling. The OECD classification probably counts as upper secondary many persons whom the UN ranks as less than complete secondary. The treatment of vocational education is particularly an issue here. Another source of discrepancy is that our figures refer to people aged 25 or over, whereas the OECD data are for those aged 25 to 64. Since secondary and tertiary attainment have been rising over time, this difference would tend to make the OECD figures on upper secondary and tertiary attainment higher than our corresponding numbers. Further research is warranted to pin down the exact relation between the Barro-Lee and OECD data. See de la Fuente and Domenech (2000) for additional discussion.

Table 2

Barro-Lee and OECD data on educational attainment

Country	Barro-Lee data						OECD data			
	No school	Primary	Partial secondary	Complete secondary	Tertiary	Years of school	Below upper secondary	Upper secondary	Tertiary	Years of school
Australia	2	25	28	21	24	10.3	47	29	24	11.9
Austria	1	32	25	31	12	8.4	31	62	8	11.9
Belgium	5	49	21	10	16	8.6	47	29	25	11.7
Canada	2	14	31	24	30	10.7	25	28	47	13.2
Czech Republic	1	35	33	22	9	9.3	17	73	11	12.4
Denmark	0	34	8	39	19	9.9	38	42	20	12.4
Finland	0	31	15	35	19	9.8	35	45	21	11.6
France	1	48	24	13	15	7.7	32	50	19	11.2
Germany	5	51	16	13	15	7.7	16	61	23	13.4
Greece	6	52	8	24	11	8.1	57	25	17	10.9
Iceland	2	48	22	16	13	8.4	–	–	–	–
Ireland	3	35	25	20	16	8.8	53	27	20	10.8
Italy	14	43	20	12	12	6.6	65	27	8	10.0
Japan	0	31	30	17	22	9.4	–	–	–	–
Korea	9	18	16	36	21	10.1	40	42	18	–
Luxembourg	–	–	–	–	–	–	71	18	11	–
Netherlands, The	3	32	32	14	19	9.0	39	39	22	12.7
New Zealand	0	34	18	9	39	11.3	41	34	25	11.4
Norway	1	12	23	44	21	11.8	19	53	29	12.4
Portugal	14	61	9	6	10	4.6	80	9	11	10.0

Table 2 (cont'd)

Country	Barro-Lee data						OECD data			
	No school	Primary	Partial secondary	Complete secondary	Tertiary	Years of school	Below upper secondary	Upper secondary	Tertiary	Years of school
Spain	27	33	16	13	12	5.8	72	12	16	11.2
Sweden	2	18	15	44	21	11.2	25	46	28	12.1
Switzerland	5	26	24	31	15	10.2	18	61	21	12.6
Turkey	31	47	9	7	7	4.6	77	15	8	–
UK	3	41	27	13	16	9.0	24	54	21	12.1
US	1	8	21	24	47	12.2	14	53	33	13.5
Argentina	6	53	15	10	16	8.1	73	18	9	–
Brazil	22	59	6	5	8	4.3	75	16	9	–
India	52	28	9	6	5	4.2	92	3	6	–
Indonesia	44	33	9	10	4	4.0	81	15	4	–
Malaysia	17	34	19	24	7	7.7	67	26	7	–
Paraguay	10	64	9	10	8	5.7	67	19	14	–
Thailand	20	62	5	4	9	5.7	87	3	11	–
Uruguay	3	54	23	9	10	6.9	73	12	14	–

Notes

The table shows the percentages of the population for whom the indicated level of schooling is the highest one attained. The Barro-Lee data, from Barro and Lee (1993, 1996, 2000), refer to the overall population aged 25 or over in 1995. The OECD figures, from OECD (1997, 1998a, 1998b), are for persons aged 25 to 64 in 1997 or 1998 (and for 1996 for the developing countries). In the Barro-Lee data, the average years of schooling come from multiplying the percentages at the various levels by the country's typical duration of school at that level and then summing over the categories. (This computation also considers the breakdown between partial and complete primary schooling.) The OECD procedure for this calculation is presently unclear (to us).

Basic Empirical Results

Before focussing on the results for human capital, it is worthwhile to provide a quick summary of the results for the other explanatory variables.

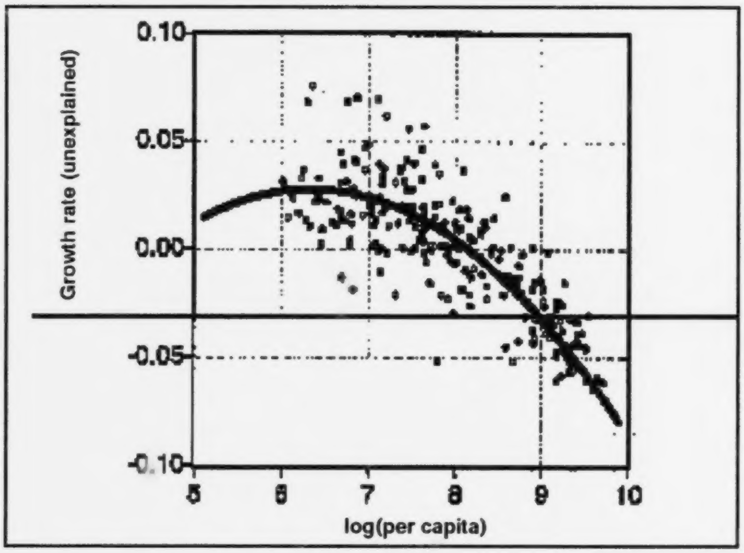
The Level of Per Capita GDP

As is now known, the simple relation across a broad group of countries between growth rates and initial well levels of per capita GDP is virtually nil. However, when the policy and other independent variables shown in column 1 of Table 1 are held constant, there is a strong relation between the growth rate and level of per capita GDP. The estimated coefficients are significantly positive for log(GDP) and significantly negative for the square of log(GDP).

These coefficients imply the partial relation between the growth rate and log(GDP) as shown in Figure 1.[6] This relation is negative overall but is not linear. For the poorest countries contained in the sample, the marginal effect of log(GDP) on the growth rate is small and may even be positive. The estimated regression coefficients for log(GDP) and its square imply a positive marginal effect for a level of per capita GDP below $580 (in 1985 prices). This situation applies mainly to some countries in Sub Saharan Africa.

Figure 1

Growth rate versus log(GDP)



For the richest countries, the partial effect of log(GDP) on the growth rate is strongly negative at the margin. The largest magnitude (corresponding to the highest value of per capita GDP in 1995) is for Luxembourg – the GDP value of $19,794 implies a marginal effect of -0.059 on the growth rate. The US has the next largest value of GDP in 1995 ($18,951) and has an estimated marginal effect on the growth rate of -0.058. These values mean that an increase in per capita GDP of 10 percent implies a decrease in the growth rate on impact by 0.6 percent per year. However, an offsetting force is that higher levels of per capita GDP tend to be associated with more favourable values of other explanatory variables, such as more schooling, lower fertility and better maintenance of the rule of law.

Overall, the cross-country evidence shows no pattern of absolute convergence – whereby poor countries tend systematically to grow faster than rich ones – but does provide strong evidence of conditional convergence. That is, except possibly at extremely low levels of per capita product, a poorer country tends to grow faster for given values of the policy and other explanatory variables. The pattern of absolute convergence does not appear because poor countries tend systematically to have less favourable values of the determining variables other than log(GDP).

In the panel for the investment ratio in column 1 of Table 3, the pattern of estimated coefficients on log(GDP) is also positive on the linear term and negative on the square. These values imply a hump-shaped relation between the investment ratio and the starting level of GDP – the relation is positive for per capita GDP below $3,800 and then becomes negative.

Government Consumption

The ratio of government consumption to GDP is intended to measure a set of public outlays that do not directly enhance an economy's productivity.[7] In interpreting the estimated effect on growth, it is important to note that measures of taxation are not being held constant. This omission reflects data problems in constructing accurate representations for various tax rates, such as marginal rates on labour and capital income, and so on. Since the tax side has not been held constant, the effect of a higher government consumption ratio on growth involves partly a direct impact and partly an indirect effect involving the required increase in overall public revenues.

Table 1, column 1 indicates that the effect of the government consumption ratio, G/Y, on growth is significantly negative. The coefficient estimate implies that an increase in G/Y of 10 percentage points would reduce the growth rate on impact by 1.6 percent per year.

Table 3, column 1 indicates that the government consumption ratio

Table 3

Panel regressions for investment ratio

Independent variable	**Overall sample**		**OECD sample**	**Rich-country sample**	**Poor-country sample**	**Wald tests of coefficients**
	(1)	(2)	(3)	(4)	(5)	(6)
Log(per capita GDP)	0.244 (0.025)	0.0143 (0.0099)	0.0180 (0.0224)	0.0027 (0.0150)	0.0115 (0.0112)	0.33
Log(per capita GDP) squared	-0.0148 (0.0053)	–	–	–	–	–
Male upper school	0.0009 (0.0058)	-0.0034 (0.0058)	0.0037 (0.0043)	0.0023 (0.0047)	-0.0017 (0.0095)	0.75
Govt. consumption/GDP	-0.236 (0.075)	-0.240 (0.078)	-0.338 (0.187)	-0.025 (0.112)	-0.281 (0.075)	0.20
Rule-of-law index	0.036 (0.020)	0.034 (0.021)	0.053 (0.068)	0.009 (0.029)	0.045 (0.025)	0.84
Openness ratio	0.431 (0.115)	0.031 (0.013)	-0.046 (0.032)	0.028 (0.013)	0.111 (0.022)	0.006
(Openness ratio)* log(GDP)	-0.047 (0.013)	–	–	–	–	–
Inflation rate	-0.093 (0.024)	-0.097 (0.025)	0.066 (0.064)	-0.014 (0.023)	-0.045 (0.024)	0.089
Log(total fertility rate)	-0.050 (0.015)	-0.046 (0.016)	0.019 (0.027)	-0.016 (0.022)	-0.069 (0.020)	0.80
Growth rate of terms of trade	0.007 (0.075)	0.017 (0.075)	0.057 (0.181)	-0.025 (0.112)	0.057 (0.078)	0.72
Numbers of observations	81, 84, 81	81, 84, 81	23, 23, 23	32, 32, 31	49, 52, 50	–
R^2	0.58, 0.61, 0.63	0.48, 0.53 0.58	-0.04, -0.03, 0.28	0.65, 0.20, 0.20	0.32, 0.51, 0.64	–

Notes

The dependent variable is the ratio of real investment (private plus public) to real GDP. The measure is the average of the annual observations on the ratio for each of the periods 1965-75, 1975-85 and 1985-92. (The data presently available from Summers and Heston [1991] end in 1992.) See the notes to Table 1 for additional information.

also has a significantly negative effect on the investment ratio. An increase in G/Y of 10 percentage points is estimated to lower the investment ratio by 2.4 percentage points. This result suggests that one way in which more non-productive public spending lowers growth is by depressing investment. However, since the investment ratio is held constant in the growth-rate panel in Table 1, the estimated negative effect of G/Y on growth applies for a given quantity of investment. The depressing effect of G/Y on the investment ratio reinforces this influence.

The Rule of Law

Many analysts believe that secure property rights and a strong legal system are central for investment and other aspects of economic activity.[8] The empirical challenge has been to measure these concepts in a reliable way across countries and over time. Probably the best indicators available come from international consulting firms that advise clients on the attractiveness of countries as places for investment. These investors are concerned about institutional matters such as the prevalence of law and order, the capacity of the legal system to enforce contracts, the efficiency of the bureaucracy, the likelihood of government expropriation, and the extent of official corruption. These kinds of factors have been assessed by a number of consulting companies, including Political Risk Services in its publication *International Country Risk Guide*.[9] This source is especially useful because it covers over 100 countries since the early 1980s. Although the data are subjective, they have the virtue of being prepared contemporaneously by local experts. Moreover, the willingness of customers to pay substantial fees for this information is perhaps some testament to their validity.

Among the various indicators available, the index for overall maintenance of the rule of law (also referred to as "law and order tradition") turns out to have the most explanatory power for economic growth and investment. This index was initially measured by Political Risk Services in seven categories on a zero to six scale, with six the most favourable. The index has been converted here to a zero-to-one scale, with zero indicating the poorest maintenance of the rule of law and one the best.

To understand the scale, note that the US and most of the OECD countries (not counting Turkey and some of the recent members) had values of 1.0 for the rule-of-law index in recent years. However, Belgium, France, Portugal and Spain were downgraded from 1.0 in 1996 to 0.83 for 1997–99, and Greece fell from 1.0 in 1996 to 0.83 in 1997, 0.67 in 1998 and 0.50 in 1999. Hungary has been rated at 1.0 in recent years, and the Czech Republic and Poland have been at 0.83. Mexico fell from 0.50 in 1997 to 0.33 in 1998-99, and Turkey fell from 0.67 in 1998 to 0.50 in 1999. Non-OECD countries rated at 1.0 in 1999 were Malta, Morocco and Singapore. (Hong Kong was downgraded upon its return to China from 1.0 in 1996 to 0.83 in 1997–99.)

No country had a rating of 0.0 for the rule of law in 1999, but countries rated at 0.0 in some earlier years included Ethiopia, Guyana, Haiti, Sri Lanka, Yugoslavia and Zaire. Countries rated at 0.5 in 1999 included Bangladesh, Bolivia, Ecuador, Malaysia, Myanmar, Pakistan, Peru, Sri Lanka, Suriname, Uruguay, several countries in Sub Saharan Africa, and much of Central America.

The results in column 1 of Table 1 indicate that, for given values of the other explanatory variables, increased maintenance of the rule of law has a positive and statistically significant effect on the rate of economic growth.[10] An improvement by one category among the seven used by Political Risk Services (i.e. an increase in the zero-to-one index of 0.17) is estimated to raise the growth rate on impact by 0.2 percent per year.

The results from the investment panel in column 1 of Table 3 show that the rule-of-law index also has a positive, but only marginally significant, effect on the ratio of investment to GDP. An improvement by one category in the underlying rule-of-law indicator is estimated to raise the investment ratio by about 0.6 percentage points. The stimulus to investment is one way in which better maintenance of the rule of law would encourage growth. However, since the investment ratio is held constant in the growth panel in Table 1, the estimated positive effect of the rule-of-law indicator on growth applies for a given quantity of investment. The stimulative effect on the investment ratio reinforces this influence.

International Openness

Openness to international trade is often thought to be conducive to economic growth. Aside from classical comparative-advantage arguments, openness tends to promote competition and, hence, efficiency. Sachs and Warner (1995) have argued empirically that international openness is an important contributor to economic growth.

The basic measure of openness used is the ratio of exports plus imports to GDP. As is well known, however, this ratio tends to be larger the smaller the country. Basically, internal trade within a large country substitutes for much of the commerce that a small country would typically carry out with other countries. Hence, only the international trade that differs from the value normally associated with country size would reflect policy influences, such as trade barriers.

I quantified the effect of country size by estimating a panel system in which the dependent variables were the openness ratios for countries at various dates. Country size was measured by the logs of land area and population. The other independent variables in this system were measures of trade policy – tariff and non-tariff barriers, the black-market premium on the foreign exchange rate, and International Monetary Fund (IMF) indicators of whether the country was restricting transactions on capital or current accounts. I then subtracted from the openness ratio the estimated effects from the logs of land area and population. This filtered variable proxies for the effects of various policy variables on international openness.

Column 1 of Table 1 shows that the filtered openness variable has a significantly positive effect on growth.[11] However, the negative effect of the interaction term with log(GDP) means that the effect on growth diminishes as a country gets richer. The coefficient estimates imply that the effect of openness on growth would reach zero at a per capita GDP of $11,700 (1985 US dollars). This value is below the per capita GDP of the richest countries, such as the US. Hence, it may well be true that the NAFTA treaty promoted growth in Mexico but not in the US and Canada.

The Inflation Rate

Column 1 of Table 1 shows a marginally significant, negative effect of inflation on the rate of economic growth.[12] The estimated coefficient implies that an increase in the average rate of inflation of 10 percent per year would lower the growth rate on impact by 0.14 percent per year.

Column 1 of Table 3 shows that the inflation rate also has a significantly negative effect on the investment ratio. This depressing effect on investment would reinforce the direct negative effect on growth that has already been discussed.

Fertility Rate

Column 1 of Table 1 shows that economic growth is significantly negatively related to the total fertility rate. Thus, the choice to have more children per adult – and, hence, in the long run, to have a higher rate of population growth – comes at the expense of growth in output per person. It should be emphasized that this relation applies when variables such as per capita GDP and education are held constant. These variables are themselves substantially negatively related to the fertility rate. Thus, the estimated coefficient on the fertility variable likely isolates differing underlying preferences across countries on family size, rather than effects related to the level of economic development.

Column 1 of Table 3 also reveals a significant negative relation between the investment ratio and the fertility rate. This relation can be interpreted as an indication that the number of children is a form of saving that is a substitute for other types of saving (which support physical investment). The negative effect of the fertility rate on the investment ratio reinforces the direct inverse effect of fertility on growth.

Investment Ratio

Column 1 of Table 1 shows that the growth rate depends positively and marginally significantly on the investment ratio. This effect applies for given values of policy and other variables, as already discussed, which affect the investment ratio. For example, an improvement in the rule of law raises investment and also raises growth for a given amount of investment. Thus, the estimated coefficient of the investment ratio in the growth panel - 0.033 (0.026) - is interpretable as an effect from a greater propensity to invest for given values of the policy and other variables.

Recall that the instrument lists for the estimation include earlier values of the investment ratio but not values that are contemporaneous with the growth rate. Hence, there is some reason to believe that the estimated relation reflects effects of greater investment on the growth rate, rather than a reverse effect from higher growth (and the accompanying better investment opportunities) on the investment ratio.

The Terms of Trade

Column 1 of Table 1 indicates that improvements in the terms of trade (a higher growth rate of the ratio of export prices to import prices) enhance economic growth. The measurement of growth rates in terms of changes in real GDP means that this relation is not a mechanical one. That is, if patterns of employment and production are unchanged, then an improvement in the terms of trade would raise real income and probably real consumption but would have a zero effect on real GDP. The positive impact of an improvement in the terms of trade on real GDP therefore reflects increases in factor employments or productivity. Column 1 of Table 3 shows that the investment ratio is not significantly related to changes in the terms of trade.

Effects of Education

Governments typically have strong direct involvement in the financing and provision of schooling at various levels. Hence, public policies in these areas have major effects on a country's accumulation of human capital. One measure of this schooling capital is the average years of attainment, as constructed by Barro and Lee (1993, 1996). These data are classified by sex and age (for persons aged 15 or over and 25 or over) and by levels of education (no school, partial and complete primary, partial and complete secondary, and partial and complete higher). As mentioned before, these data have been refined and updated in Barro and Lee (2000).

In growth-accounting exercises, the growth rate would be related to the change in human capital - say the change in years of schooling - over the sample period. My approach, however, is to think of changes in capital inputs, including human capital, as jointly determined with economic growth. These variables all depend on policy variables and national characteristics and on initial values of state variables, including stocks of human and physical capital.

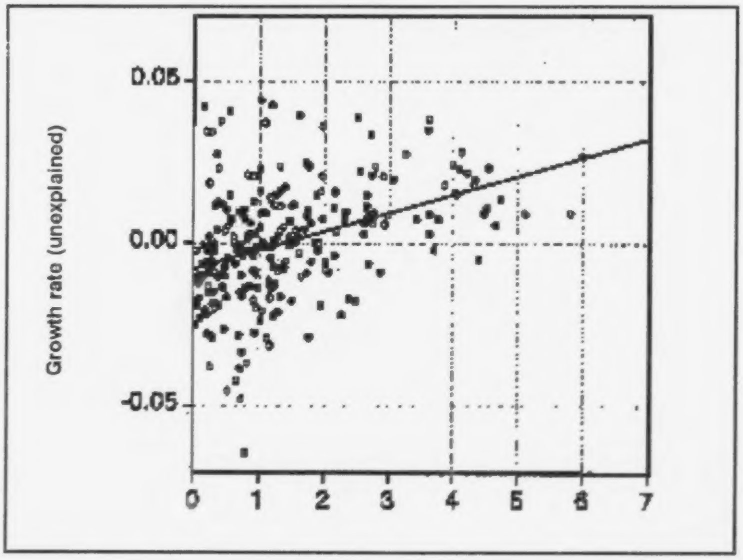
For a given level of initial per capita GDP, a higher initial stock of human capital signifies a higher ratio of human to physical capital. This higher ratio tends to generate higher economic growth through at least two channels. First, more human capital facilitates the absorption of superior technologies from leading countries. This channel is likely to be especially important for schooling at the secondary and higher levels. Second, human capital tends to be more difficult to adjust than physical capital. Therefore, a country that starts with a high ratio of human to physical capital - such as in the aftermath of a war that destroys primarily physical capital - tends to grow rapidly by adjusting upward the quantity of physical capital.

Years of Schooling

Column 1 of Table 1 shows that the average years of school attainment at the secondary and higher levels for males aged 25 or over has a positive and significant effect on the subsequent rate of economic growth.[13] Figure 2 depicts this partial relationship. The estimated coefficient implies that an additional year of schooling (roughly a one-standard-deviation change) raises the growth rate on impact by 0.44 percent per year. As already mentioned, a possible interpretation of this effect is that a workforce educated at the secondary and higher levels facilitates the absorption of technologies from more advanced for-

Figure 2

Growth rate versus schooling



eign countries.

The implied social rate of return on schooling is somewhat involved. First, the system already holds fixed the level of per capita GDP and, therefore, does not pick up a contemporaneous effect of schooling on output. Rather, the effect from an additional year of average school attainment has an impact on the growth rate of GDP and thereby affects the level of GDP gradually over time. Because of the convergence force – whereby higher levels of GDP feed back negatively into the growth rate – the ultimate effect of more schooling on the level of output (relative to a fixed trend) is finite.

If the convergence rate (the coefficient on log[GDP] in a linear specification) is 2.5 percent per year (the average effect across countries), then the coefficient of 0.0044 on the schooling variable implies that an additional year of attainment for the typical adult raises the level of output asymptotically by 19 percent. This figure would give the implied social real rate of return to education (for males at the secondary and higher levels) if the cost of an individual's additional year of schooling equalled one year of foregone per capita GDP, if there were no depreciation in stocks of schooling capital (e.g. due to aging and mortality), and if the adjustment to the 19 percent higher level of output occurred with no lag. The finiteness of the convergence rate and the presence of depreciation imply lower rates of return. However, the cost of an added year of schooling is likely to be less than one year's per capita GDP, because the cost of students' time spent at school would be less than the economy's average wage rate. We must, however, also consider the costs of teachers' time and other school inputs. In any event, if we neglect depreciation and assume that the cost of an additional year of schooling equals one year's foregone per capita GDP, then a convergence rate of 2.5 percent per year turns out to imply a real rate of return to schooling of 7 percent per year. This figure is within the range of typical micro-economic estimates of returns to education.

Table 4 considers additional dimensions of the years of schooling. Female attainment at the secondary and higher levels turns out not to have significant explanatory power for growth – see column 1. One possible explanation for the weak role of female upper-level schooling in the growth panel is that many countries follow discriminatory practices that prevent the efficient exploitation of well-educated females in the formal labour market. Given these practices, it is not surprising that more resources devoted to upper-level female education would not show up as enhanced growth.

Male primary schooling is insignificant for growth, as shown in column 2 of Table 4. Female primary schooling is positive (column 3), but still statistically insignificant. The particular importance of schooling at

Table 4

Panel regressions for growth rate – additional measures of human capital in overall sample

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Female upper school	-0.0011 (0.0040)	–	–	–	–	–	–
Male primary school	–	0.0011 (0.0013)	–	–	–	–	–
Female primary school	–	–	0.0019 (0.0013)	–	–	–	–
Male upper school squared	–	–	–	-0.0003 (0.0007)	–	–	–
Male upper school *log(GDP)	–	–	–	–	-0.0002 (0.0019)	–	–
Log(life expectancy)	–	–	–	–	–	0.0158 (0.0147)	–
Infant mortality rate	–	–	–	–	–	–	-0.042 (0.049)

Notes

The variables shown are entered, one at a time, into the system described in column 1 of Table 1. Estimated coefficients of the other variables contained in Table 1 are not shown. The various years of school attainment are for persons aged 25 or over. Life expectancy applies at birth. The infant mortality rate is for persons aged less than one year. The life expectancy and infant mortality variables are measured at the start of each period and are included in the instrument lists. See the notes to Table 1 for additional information.

the secondary and higher levels (for males) supports the idea that education affects growth by facilitating the absorption of new technologies – which are likely to be complementary with labour educated to these higher levels. Primary schooling is, however, critical as a prerequisite for secondary education.

Another role for primary schooling involves the well-known negative effect of female primary education on fertility rates. However, the female primary attainment variable would not be credited with this growth effect, because the fertility variable is already held constant in the growth panels. If fertility is not held constant, then the estimated coefficient on female primary schooling becomes significantly positive: 0.0039 (0.0013).[14] Hence, this result suggests that female primary education promotes growth indirectly by encouraging lower fertility.

Column 1 of Table 3 indicates that years of schooling (for males at the secondary and higher levels) are insignificantly related to the investment ratio. Hence, the linkage between human capital and growth does not involve an expansion in the intensity of physical capital. This result is inconsistent with some of the theoretical effects mentioned before involving the ratio of human to physical capital.

Quality of Education

Many researchers argue that the quality of schooling is more important than the quantity, measured, for example, by years of attainment. Barro and Lee (1998) discuss the available cross-country aggregate measures of the quality of education. Hanushek and Kimko (2000) find that scores on international examinations - indicators of the quality of schooling capital - matter more than years of attainment for subsequent economic growth. My findings turn out to accord with their results.

Information on test scores - for science, mathematics, and reading - are available for 43 of the countries in my sample for the growth panel.[15] One shortcoming of these data is that they apply to different years and are most plentiful in the 1990s. The available data were used to construct a single cross-section of test scores on the science, reading and mathematics examinations. These variables were then entered into the panel systems for growth that I considered before. In these systems, the test scores vary cross-sectionally but do not vary over time within countries.

One difficulty in the estimation procedure is that later values of test scores (e.g. from the 1990s) are allowed to influence earlier values of economic growth, such as for the 1965-75 and 1975-85 periods. The idea that the coefficients represent effects of schooling quality on growth therefore hinges on the persistence of test scores over time within countries. That is, later values of test scores may be reasonable proxies for earlier, unobserved values of these scores. Fortunately for this interpretation, the results turn out to be nearly the same if the instrument lists omit the test-score variables and include instead only prior values of variables that have predictive content for test scores. These variables are the total years of schooling of the adult population (a proxy for the education of parents) and pupil:teacher ratios at the primary and secondary levels. Results are also similar if prior values of school dropout rates, which are inversely related to test scores, are added as instruments.

The results for the growth effects of test scores are shown in Table 5. Note that sample sizes are less than half of those from Table 1 because of the limited availability of the data on examinations. The countries included are also primarily rich ones. For example, for the broadest sample of 43 countries in column 8, only 14 of the countries had a per capita GDP below $5,000 in 1985.

Science scores are significantly positive for growth, as shown in column 1 of Table 5. With this scores variable included, the estimated coefficient of male upper-level attainment is still positive but only marginally significant. (The coefficients for the other explanatory vari-

Table 5

Panel regressions for growth rate – effects of test scores in overall sample

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Science score	0.129 (0.022)	–	–	0.064 (0.037)	0.060 (0.021)	–	0.034 (0.027)	–
Mathematics score	–	0.076 (0.022)	–	0.036 (0.029)	–	-0.001 (0.027)	-0.017 (0.029)	–
Reading score	–	–	-0.025 (0.040)	–	0.034 (0.026)	0.074 (0.028)	0.067 (0.028)	–
Overall test score	–	–	–	–	–	–	–	0.125 (0.029)
Male upper school	0.0019 (0.0011)	0.0019 (0.0013)	0.0013 (0.0018)	0.0020 (0.0012)	0.0000 (0.0009)	0.0010 (0.0009)	0.0009 (0.0009)	0.0017 (0.0015)
Numbers of observations	37, 37, 36	34, 34, 33	32, 32, 32	34, 34, 33	26, 26, 26	23, 23, 23	23, 23, 23	43, 43, 42
R^2	0.72, 0.45, 0.28	0.68, 0.52, 0.55	0.72, 0.39, 0.53	0.69, 0.52, 0.51	0.82, 0.29, 0.53	0.74, 0.36, 0.55	0.76, 0.33, 0.54	0.65, 0.59, 0.37

Notes

Test scores from science, mathematics and reading examinations are measured as percent correct. The data used are a cross-section, consisting of only one average score in each field per country (for countries for which the data are available). The overall test score, used in column 8, equals the science score where available. The overall score uses the reading score, adjusted for differences in average levels from the science scores, to fill in some additional observations. (The mathematics scores turn out not to generate any additional useable observations, once the science scores are considered.) The test-score variables were entered into the system for the overall sample described in column 1 of Table 1. The test-scores variables are included in the instrument lists for each equation. For the other explanatory variables in the system, the estimated coefficient of the male upper school variable is shown, but the other estimated coefficients are not shown. See the notes to Table 1 for additional information.

ables are not shown in the table.) The estimated coefficient on the science scores – 0.13 (0.02) – implies that a one-standard-deviation increase in scores – by 0.08 – would raise the growth rate on impact by 1.0 percent per year. In contrast, the estimated coefficient for the school attainment variable – 0.002 (0.001) – implies that a one-standard-deviation rise in attainment would increase the growth rate on impact by only 0.2 percent per year. Thus, the results suggest that the quality and quantity of schooling both matter for growth but that quality is much more important. However, this finding does not instruct a country on how to improve the quality of education, as reflected in test scores. For some tentative results along these lines, see Barro and Lee (1998).

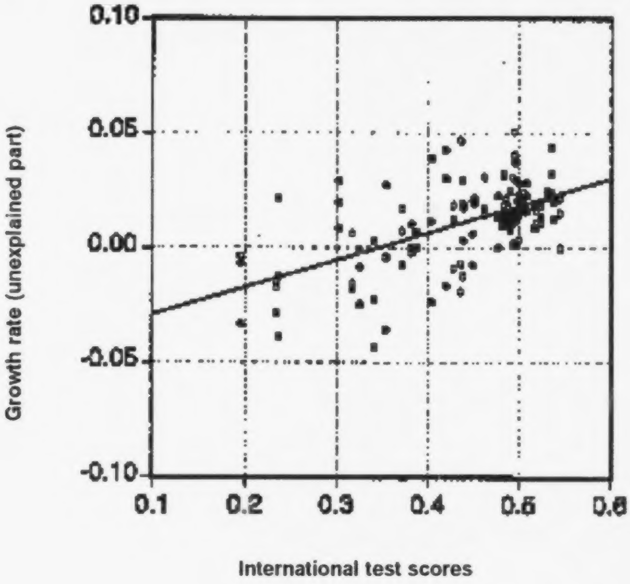
Mathematics scores are also significantly positive in column 2 but less significant than the science scores. Column 4 includes the two scores together, and the results indicate that the science scores are somewhat more predictive of economic growth.

Reading scores are puzzlingly negative in column 3. However, the reading coefficient becomes positive when this variable is entered jointly with the science scores in column 5, the mathematics scores in column 6, or the science and mathematics scores in column 7. (Note, however, that, because of the limited number of countries that have results for reading and either science or mathematics, the sample of countries in columns 5 to 7 is substantially smaller than that in column 3.)

Finally, as an attempt to increase the sample size, I constructed a single cross-section for a test-scores variable that was based on science scores, where available, and then filled in some missing observations by using the reading scores.[16] This filling-in was accomplished by using the average relation between science and reading scores for countries in which results on both examinations were available. This procedure raises the sample of countries by six from that in column 1 of the table. The results, shown in column 8, are similar to those found

Figure 3

Growth rate versus test scores



in column 1. Figure 3 shows graphically the partial relation between economic growth and the overall test-scores variable.

Health Variables

Conceptually, a country's human capital would include health and dimensions of social capital, as well as education. Table 4 considers two basic, aggregate measures of health capital – life expectancy at birth and the infant mortality rate. These variables are each measured around the start of each sub-period: 1965, 1975 and 1985.

The estimated coefficient on the log of life expectancy – when this variable is added to the system from column 1 of Table 1 – is positive but not statistically significant, 0.016 (0.015). Similarly, the estimated coefficient on the infant mortality rate, -0.042 (0.049), is negative but not statistically significant. Hence, there is some indication that more health capital increases economic growth – holding fixed school attainment and other variables – but the results are not very reliable. It may be worthwhile to consider additional dimensions of health capital, such as morbidity measures and more details on life expectancy as a function of age.

Rich (or OECD) Countries Versus Poor Countries

The results described thus far pertain to the full sample of countries for which data are available. However, since the test-scores data are available primarily for rich countries, the results shown in Table 5 apply mainly to this sample.

Columns 3 to 5 of Tables 1 and 3 show how the basic results change if the sample is restricted to OECD countries (defined to comprise only the 24 that were members before the 1990s), rich countries (defined as places in which per capita GDP in 1985 exceeded $5,000) and poor countries. Since the OECD countries dominate the rich sample, the results for these two cases – columns 3 and 4 of the tables – are similar in most respects.[17]

The results in columns 3 to 5 of Tables 1 and 3 omit the interaction terms with log(GDP) – that is, the squared term in log(GDP) and the interaction between the openness ratio and log(GDP). For comparison, column 2 of the tables shows the results for the full sample under this specification. Note that, for economic growth over the full sample, the estimated coefficient on log(GDP) – the convergence rate – is -0.0244 (0.0031) or about 2.5 percent per year. This number, described as the "iron law of convergence" in some previous studies, can be interpreted as the average rate of convergence for the broad set of countries. The corresponding coefficient for the openness ratio is 0.0172 (0.0047).

The separate results for economic growth for rich and poor countries are shown in columns 4 and 5 of Table 1. Column 6 shows p-values for Wald tests of equality of the coefficients of the variables for the rich and poor countries. Two differences are the higher rate of convergence in rich countries (-0.034 vs. -0.019) and the larger effect of openness in poor countries (0.036 vs. 0.011). These differences were taken into account by the interaction terms in column 1 of the table. Other notable differences are the larger negative effect of government consumption in poor countries (-0.17 vs. -0.01) and the larger positive effect of the change in the terms of trade in poor countries (0.13 vs. -0.01). No other estimated coefficients differ significantly at the 10 percent significance level. With respect to the upper-schooling variable, the estimated effect is larger in poor countries (0.0084 vs. 0.0023) but the p-value for the difference in the two estimated coefficients (0.12) exceeds 10 percent.

For the investment ratio in Table 3, the main difference in coefficients between rich and poor countries is in the openness ratio - 0.11 for poor versus 0.03 for rich. The estimated coefficients on the inflation rate (-0.045 for poor vs. -0.014 for rich) also differ significantly at the 10 percent level (p-value = 0.09).

The conclusions from this exercise are not straightforward. If one is most interested in policy implications for OECD countries, then one might be tempted to rely on the results that use only OECD or rich countries - columns 3 and 4 in Tables 1 and 3. This procedure has the virtues of avoiding the low quality of data from poor countries and of not contaminating the rich-country results with those from places that are just too different because they are so much poorer. One shortcoming, however, from the limited range of experience of the OECD or rich samples is that it is hard to pin down the effects of most of the variables. For example, for the OECD group in column 3 of Table 1, the only variables that are at least marginally significant for explaining growth are initial GDP (the convergence effect), the openness ratio, the fertility rate and the ratio of investment to GDP. For the investment ratio in column 3 of Table 3, the only significant variable for the OECD sample is the government consumption ratio.

My preference is to use the overall data to exploit the wide range of experience in policies and other variables from the broad world sample. Then, some modifications to the specification can be included to achieve more homogeneity between rich and poor countries. The interaction terms with the log of per capita GDP that were included in column 1 of Tables 1 and 3 are examples of this approach. With these modifications, my inclination would be to rely on the full-sample results even when considering applications to a sample of OECD or rich countries.

Other Policy Influences on Growth and Investment

Other research has considered additional influences on economic growth and investment. One area that is of particular concern to continental Europe involves governmental interventions into the operations of labour markets. The interventions that exist include mandated levels of wages and benefits, restrictions on labour turnover, and official encouragement of collective bargaining.

The assessment of the effects of these kinds of policies for a broad sample of countries has been hampered by lack of good data. To get a rough idea of whether these sorts of restrictions matter for growth, I used two crude proxy variables. One was based on labour-standards conventions adopted by the International Labour Organization (ILO). (The adoption of some selected standards was taken as a sign that the country was interfering more broadly with labour markets.) The other was survey information collected by Jeffrey Sachs and Andrew Warner for the competitiveness project of the World Economic Forum.

Regression results that used these data were suggestive of negative effects from labour-market restrictions on economic growth. However, probably because of the poor quality of the data, these findings were not statistically significant.

I have also examined data on public debt for a broad group of countries. The evidence is that a larger stock of debt in relation to GDP has no significant explanatory power for economic growth or the ratio of investment to GDP.

King and Levine (1993) analysed the development of domestic capital markets. They used several measures of this development, including the extent of intermediation by commercial banks and other domestic financial institutions. The general finding is that the presence of a more advanced domestic financial sector predicts higher economic growth. The main outstanding issue here is to disentangle the effect of financial development on growth from the reverse channel. In particular, it is important for future research to isolate the effects of government policies (e.g. on regulation of domestic capital markets) on the state of financial development and, hence, on the rate of economic growth.

Easterly and Rebelo (1993) examined aspects of public investment and also considered the nature of tax systems. One result is that public investment does not exhibit high rates of return overall. The main positive effects on economic growth emerged for investments in the area of transportation. With regard to tax systems, the findings were largely inconclusive because of the difficulties in measuring marginal tax rates on labour and capital incomes in a consistent and accurate way for a large sample of countries. Hence, an important priority for future research is better measurement of the nature of tax systems.

Summary of Major Results

The determinants of economic growth and investment were analysed in a panel of around 100 countries observed from 1960 to 1995. The data reveal a pattern of conditional convergence in the sense that the growth rate of per capita GDP is inversely related to the starting level of per capita GDP, holding fixed measures of government policies and institutions, initial stocks of human capital and the character of the national population.

With respect to education, growth is positively related to the starting level of average years of school attainment of adult males at the secondary and higher levels. Since workers with this educational background would be complementary with new technologies, the results suggest an important role for the diffusion of technology in the development process. Growth is insignificantly related to years of school attainment of females at the secondary and higher levels. This result suggests that highly educated women are not well used in the labour markets of many countries. Growth is insignificantly related to male schooling at the primary level. However, this level of schooling is a prerequisite for secondary schooling and would, therefore, affect growth through this channel. Education of women at the primary level stimulates economic growth indirectly by inducing a lower fertility rate.

Data on students' scores on internationally comparable examinations in science, mathematics and reading were used to measure the quality of schooling. Scores on science tests have a particularly strong positive relation with economic growth. Given the quality of education, as represented by the test scores, the quantity of schooling – measured by average years of attainment of adult males at the secondary and higher levels – is still positively related to subsequent growth. However, the effect of school quality is quantitatively much more important.

The results from a broad panel of countries were compared with findings for rich and poor countries considered separately. (The results for OECD countries were similar to those for the larger group of rich countries.) Some differences that emerge for the determination of economic growth are a higher convergence rate in rich countries, larger effects from international openness and terms-of-trade changes in poor countries, and more negative effects from government consumption in poor countries. Despite these differences and issues about data quality in poor countries, my conclusion is that the broad sample of countries should be used, even if one's interest is limited to rich countries. The reason is that the observed variations in policy and other variables among rich countries is too limited to make accurate inferences.

Notes

[1] This research has been supported, in part, by the National Science Foundation.

[2] Whereas researchers and policy makers in OECD countries are often sceptical about the value of including information on developing countries, researchers and policy makers

from development institutions and poor countries are often doubtful about the use of incorporating data from the rich countries. The first position, which relies on issues about data quality and modelling consistency, seems more defensible than the second. If one is interested in recipes for development, then one surely ought to include in the sample the countries that have managed to develop.

[3] For investment, the third period is 1985–92.

[4] The GDP figures in 1985 prices are the purchasing-power-parity adjusted, chain-weighted values from Summers and Heston, version 5.6. These data are available on the Internet from the National Bureau of Economic Research. See Summers and Heston (1991) for a general description of their approach. Real investment (private plus public) is also from this source.

[5] Our data also distinguish partial from complete primary education, but that distinction is not made in Table 2. The primary schooling data in the table refer to the percent of the population for whom some level of primary schooling is the highest level attained.

[6] The variable plotted on the vertical axis is the growth rate net of the estimated effect of all explanatory variables aside from log(GDP) and its square. The value plotted was also normalized to make its mean value zero.

[7] The system contains as an explanatory variable the average ratio of government consumption to GDP over the period in which growth is measured. However, the estimation uses a set of instrumental variables that contains prior ratios of government consumption to GDP but not the contemporaneous ratios. The standard international accounts include most public outlays for education and defence as government consumption, although these types of expenditures can reasonably be regarded as primarily investment. These two categories have been deleted from the measure of government consumption used here. If considered separately, the ratio of public spending on education to GDP has a positive, but statistically insignificant, effect on economic growth. The ratio of defence outlays to GDP has roughly a zero relation with economic growth.

[8] In previous analyses, I also looked for effects of democracy, measured either by political rights or civil liberties. Results using subjective data from Freedom House (see Gastil 1982-1983) indicated that these measures had little explanatory power for economic growth or investment, once the rule-of-law indicator and the other variables shown in Table 1 were held constant.

[9] These data were introduced to economists by Knack and Keefer (1995). Two other consulting services that construct this type of data are BERI (Business Environmental Risk Intelligence) and Business International (now a part of the Economist Intelligence Unit).

[10] The variable used is the earliest observation available for each country for the first two equations – in most cases 1982 and, in a few cases, 1985. For the third equation, the average value of the rule-of-law index for 1985–94 is used. Since the data on the rule-of-law index begin only in 1982 or 1985, later values of this variable are allowed to influence earlier values of economic growth and investment in the 1965–75 and 1975–85 periods. (For the third equation, the instrument list includes the rule-of-law value for 1985 but not for later years.) The idea here is that institutions that govern the rule of law tend to persist over time, so that the observations for 1982 or 1985 are likely to be good proxies for the values prevailing earlier. The estimated effect of the rule-of-law index on economic growth is still positive, but less statistically significant, if the sample is limited to the growth observations that apply after the early 1980s.

[11] One concern is whether this relation could reflect a reverse effect from growth on the trade shares. I have also considered systems in which the openness ratios are deleted from the instrument lists and are replaced by measures of tariff and non-tariff barriers, lagged values of the black-market premium on the foreign exchange, and lagged values of IMF dummy variables for whether a country was restricting transactions on capital or current accounts. If I exclude from the system the interaction terms between the openness ratios and the logs of GDP, then the results with the instruments are similar to, but less statistically significant than, those found when the openness ratios are included in

the instrument lists. However, if the interaction terms are included (and corresponding interaction terms are added to the instrument lists), then the estimated coefficients on the openness ratio and the interaction term are individually statistically insignificant. That is, the instruments are not good enough to distinguish empirically between these two openness variables.

[12] The system includes lagged, but not contemporaneous, inflation in the instrument lists. Because of the concern about reverse causation – lower growth causing higher inflation – the panel estimation in Table 1 was also carried out without lagged inflation in the set of instruments. Rather, the system included dummy variables for prior colonial history as instruments. These dummy variables have substantial predictive content for inflation. (An attempt to use central-bank independence as an instrument failed because this variable turned out to lack predictive content for inflation.) The estimated coefficient on the inflation rate in the specification with the colonial instruments is larger in magnitude and more statistically significant than that shown in column 1 of Table 1. However, the colonial instruments cannot be used in some more limited samples, such as the group of OECD countries.

[13] The results are basically the same if the years of attainment apply to males aged 15 or over.

[14] The estimated coefficient on male upper-level schooling in this system is somewhat higher than before: 0.0054 (0.0018). If the fertility variable is excluded and female upper-level schooling is entered instead of female primary schooling, then the estimated coefficient on the female variable is close to zero, similar to that shown in column 1 of Table 4.

[15] Information is available for 51 of the countries in the Summers-Heston data set for real GDP. However, some of these countries were missing data on other variables.

[16] The mathematics scores turned out not to provide any additional observations.

[17] Of the 24 countries that were members of the OECD before the 1990s, the one missing from the system is Luxembourg. The difficulty is missing data on education (from the Barro-Lee data set) and the terms of trade.

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4

The Role of Knowledge in Economic Growth

Gunnar Eliasson

1. Introduction – Opening Up the Knowledge Box

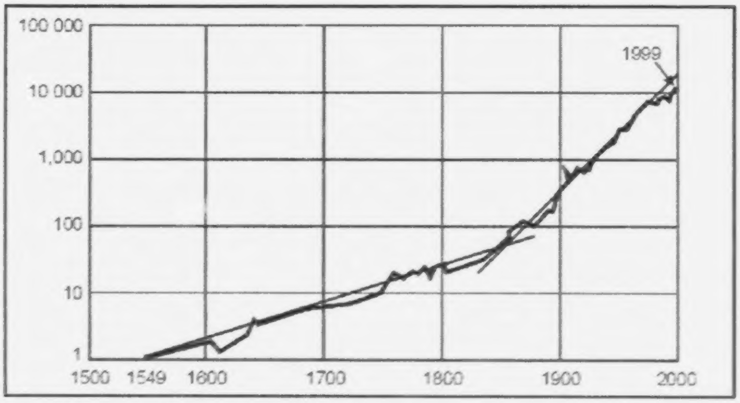
Figure 1 sets the stage for our discussion. The kink of the curve signifies the "onset" of an important historical process, commonly called the industrial revolution. Around that kink a number of events took place. First, and probably most important (Eliasson 1991c) the production system of Sweden and the now industrialized mature economies were thoroughly deregulated by the rapid removal of the craft system. Parallel to this, significant investments in public schooling were initiated. Third, at that time the new technology of the industrial revolution – based on the invention and increased sophistication of machine tools since the second half of the 18th century in England – was rapidly being introduced among the now mature industrial economies, allowing for fundamental reorganization of production. Great opportunities were created, but even though the new technology was to a large extent internationally available, only a handful of countries made it onto the faster growth track, under significant social disruption and effort. The local ability to put the new technology to industrial use (**receiver competence**) (Eliasson 1990a) mattered. Since that time and until recently a diminishing income inequality could be observed in the industrializing economies, as people left agriculture and the handicrafts to earn higher and steadily increasing wages in firms enjoying, for a long time, steadily increasing returns. Several questions can be asked. The important one today is what kind of knowledge capital played the role of a moving force behind this development. This knowledge capital has to be broadly defined to explain what happened, including the social capital that facilitated, or allowed the radical change in the circumstances of the ordinary citizen that took place. Another question is: Is something similar happening now, as we enter the new economy?

The heavy line in Figure 1 suggests one explanation. During that period, 17 out of the 32 largest manufacturing firms[1] that still dominate Swedish manufacturing industry were started. Can we observe a

Figure 1

Swedish manufacturing production 1549–1998

Index 1875 = 100



Source: G. Eliasson. 1988. "Innovation, Market Structure and the Stability of Industrial Development." In H. Hanusch (ed.), *Evolutionary Economics*, 1158 and updates. Cambridge: Cambridge University Press.

similar and promising surge in radically new firm establishment today that forebodes a new economy? If so, what kind of human capital is moving that change and what kind of social capital will accommodate the individual sacrifices associated with the same change? In saying so we have introduced a narrow definition of social capital that can be fairly clearly explained as to functionality. It has some similarity with what Jozef Ritzen (2001) calls "social cohesion." I argue that we should begin there, before broadening the concept of capital beyond the limits of measurement. The purpose has to be understood before a meaningful definition of its sources should be attempted.[2]

Describing and representing growth statistically is now standard economics in various forms of macro production function analysis, including new growth theory. There is always a way of proxying in a performing measure of knowledge in the econometric equations. Understanding the role of knowledge in growth (Abramowitz 1988) is more difficult. You then have to open up the macro box called technology and let all the actors out in their capacity of being carriers of competence (dynamics). You also have to open up the Keynesian demand box to allow the customers to play the roles of competence contributors and final arbiters of value that they play in reality. After that we may not be able to close the box again. Or should we continue to assume that the nature of the behavioural dynamics within the box has no influence on the macro development that we describe statistically in neoclassical production function econometrics. Of course not. If we want to understand we have to look inside, and represent the complicated dynamics between more or less autonomous behaving (and live) actors with a varied assortment of embodied competencies at the micro market level. This is the macro development that we **describe** by statistical methods, but that requires a dynamic micro-to-macro **explanation**.

So I will break open the macro box of new growth theory (Romer 1986, 1990) to find the Marshallian (1890, 1919) "industrial district," and the demand box to find active customers that contribute to product quality development. I will then populate those theoretical boxes with live actors with competence to build a model of growth through competitive selection. Marshall had the same problem as Romer, namely to make the necessary conditions (for equilibrium) in the Walrasian model (i.e. decreasing returns) compatible with the standard empirical observation of increasing returns and growth. The solution of Marshall, as well as that of Romer, was a collective or infrastructure district effect, or a technological spillover system (Nadiri 1978, 1993) to use modern terminology.

At each point in time, each actor in the industrial district was assumed by Marshall (1890) and Romer (1986, 1990, who kept himself at the macro surface) to experience decreasing returns. Over time, however, their individual decisions raised the collective infrastructure knowledge capital, such that continuing long-run increasing returns could be observed. In the short term, however, steeply decreasing returns to learning or building infrastructure knowledge capital had to be assumed to secure an interior equilibrium.

Neither Marshall nor Romer discussed the live and unpredictable actors inside the district or the macro box and how they kicked and pushed the entire system. This is necessary to endogenize economic growth. This is what I will do by introducing the enormous complexity and vastness of the **knowledge-based information economy** (Eliasson 1987b, 1990b, OECD 1995), the selective dynamics of the **Experimentally Organized Economy** (EOE) (Eliasson 1987a, 1991b, 1992) and its component part, **competence bloc theory** (Eliasson and Eliasson 1996, Eliasson 1998c). The former features every activity as a business experiment based on local competence that is insufficient to control the outcome, making business mistakes a standard cost for economic development and **learning**. The latter explains how this selection and learning can be organized efficiently (i.e. such that the incidence of two types of business errors is minimized). The two errors are to keep losers on for too long and to lose the winners. The solution is to expose each project to a maximum of varied competence (evaluation). Two categories of collective knowledge capital emerge from this observation. The first is the dominant competence capital (Eliasson 1989) distributed over and embodied in individuals and firms that has to enter economic analysis. Key to understanding is how the knowledge base of the economy is organized for efficient selection. Implicit in this observation is that the value ("size") of the knowledge base becomes dependent on its allocation. The beauty of competence bloc analysis (within the EOE) is that the role of tacit, incommunicable knowledge or competence (Eliasson 1990a) can be explicitly dealt with through **organization**. Knowledge does not have to be functionally defined. The carriers are identified instead. Organization enters as a separate competence category (Eliasson 1992). Organization and endogenous organizational change (organizational learning/dynamics) are much neglected phenomena in mainstream economics. The reason is very simple and human. If allowed in, it inevitably uproots the standard mathematical structure of the neoclassical model, which one should of course avoid, if one has nothing to offer instead.

The effects of the dynamics created by growth through competitive selection inevitably spill into the social dimension of the economy, notably the labour market. Individuals have to be equipped with a particular social capital to accept and cope with change, a local change that is largely unpredictable and arbitrary as seen by the individual.

2. Departure from the Neoclassical Paradigm into the Knowledge-based Economy

The departure from the neoclassical paradigm is not that large in principle, but significant in its implications. Most simply expressed; we keep the standard convexity assumptions of the Walras-Arrow-Debreu (WAD) or neoclassical model, but do not impose Walrasian market clearing. Then we do not have to bother about the continuity assumptions that analysts of the WAD model need to secure a unique equilibrium. The interesting question is what giving up the market clearing assumption means for the existence of an exogenous equilibrium and classical price-taking behaviour of agents. Both vanish, and really, we do not want the static equilibrium as traditionally defined. What we lose from abandoning static equilibrium is analytical simplicity. But this is good and healthy. As economic advisors, we (the economists) then do not get fooled by the a priori assumptions of our theoretical tools into believing that we know more about the real economy than we really do. This insight is long overdue in view of the enormous, and close to disastrous, influence the professional economists have occasionally had on policy making (Eliasson 1998c, 2000a, Eliasson and Taymaz 2000). Summarizing, the axioms of both the WAD and the EOE models are shown in Table 1.

The state space of the WAD model is very small, sufficiently so to make explicit profit and utility maximization possible. In the WAD state space actors are locked in place in equilibrium. There is no room for any form of autonomous ("live") behaviour. Institutions regulating

Table 1

The axioms of the EOE models

1. State space; enormous and extremely varied
2. Behaviour characteristics
   - bounded rationality
   - tacit knowledge
   - intuition
3. Institutions regulating entry into state space

Source: G. Eliasson. 1996, p. 24.

access to state space have no analytic meaning. Such things as entry or exit do not occur.

In the knowledge-based information economy (Eliasson 1987a, 1990a, 1990b), however, the state space is extremely large and complex, sufficiently large to preclude any form of overview from one point. I call it the business opportunity space. Hence, optimization in the WAD full information (or almost so) sense is precluded (by **realistic assumptions**). Firms do strive for maximum ex ante profits, but never reach that state, partly because the ex ante optimum is a subjective perception of each actor and partly because searching for it draws resources. Hence, their decisions are fraught with error, **business mistakes becoming a standard cost for economic development**. These business errors should not be assumed to be random (Knight 1921, Eliasson 1990a). They constitute information costs in the economy that are influenced by technological change and affect its equilibrium properties (Eliasson 1991b). Market clearing is possible neither in a deterministic nor in a rational equilibrium sense.

Even an enormous state space would eventually be "penetrated" and made transparent under the assumptions of the WAD model. Simply speaking, if there are no (or sufficiently small) transactions costs, actors go on searching for information using some form of statistical learning method (Lindh 1993). This option is precluded in the knowledge-based information economy. First, information and communications costs are demonstrated to be (Eliasson 1990a, 1990b) dominant, accounting for at least 50 percent of production costs in manufacturing and an even higher share at the gross national product (GNP) level. This being the case an equilibrium trajectory, however defined, will be dependent on information and communication costs and, hence, on information and communications technology change (i.e. change in the technology of search). It then becomes meaningless to construct models with simple exogenous and analytically determinable equilibria.

But this is a technical detail. Mathematicians are uncomfortable with open-ended state spaces. They want them closed from above by outside forces. Hence, the possibility is always there that some bold explorer or an assumed Walrasian superauctioneer will eventually find the optimal place, however large state space is. State spaces in economics, however, should not be assumed to be given data. We may realistically argue that they are extremely large at each point in time, and impossible to survey more than fractionally (by each agent) at each point in time. But assume realistically that the **business opportunity space is limited by the unknown sum total of all knowledge of each actor in the state space and all possible useful, but even more unknown combinations of the same knowledge** (Eliasson 1987a, 1990b, 1992, 1999).[3] Then search into the same state space for more investment opportunities will create new opportunities (new combinations with so far not discovered combinations). **State space keeps expanding from learning**. This is true in the Joseph Schumpeter model I from 1911. The state space grows from being exploited. I have called this the "Särimner effect" (Eliasson 1987a, 29; 1991b, 1992) from the pig in the Viking saga that was eaten for supper, but returned again next evening to be eaten again. In the EOE that we now enter, the pig even increases in size from being eaten. **We have a potential positive sum game**, which is needed to formulate endogenous growth theory.

3. The Experimentally Organized Economy

In the EOE,[4] full penetration of state space for optimal positioning by all agents is impossible at each point in time, and (because of learning) at each future point of time.

In the EOE, each agent sets up a business experiment that is tested in the market in a confrontation with all other agents, which is frequently found to be a business mistake. In the EOE, hence, room is made for autonomous behaviour in the sense of Table 1 and access to state space is regulated by institutions carrying an economic meaning. In fact, the competence of a firm is best characterized as in Table 2.

Table 2

Competence specification of the experimentally organized firm

Orientation
1. Sense of direction (business intuition)
2. Risk willing

Selection
3. Efficient identification of mistakes
4. Effective correction of mistakes

Operation
5. Efficient coordination
6. Efficient learning feedback to (1)

Source: G. Eliasson. 1996, p. 56.

Table 2 represents a typical situation of a firm in the EOE (Eliasson 1996, p. 56; 1998a, p. 87). First, no actor, including government, can survey the entire opportunity set from one point. It is not transparent and business mistakes will be made by all actors all the time. Such mistakes should be regarded as a normal cost for economic development. Second, some actors may hit the absolutely best solution by pure chance, but they will never know, and nobody else either. Hence, third, the economy will always be operating far below its production possibility frontier, thus violating a standard assumption of neoclassical theory.

Fourth, as a business actor you must always believe in your proposed business experiment. If not, you cannot act decisively and forcefully. Fifth, however, whatever you have invented you know one thing with almost certainty: there will be many potential solutions that are much better. Therefore, and sixth, you have to recognize that among your many competitors you cannot be alone with such a good idea as yours. You have to act decisively and prematurely on the basis of your competent judgement **(intuition)** before somebody else has acted successfully. Each new solution, therefore, has the character of a business experiment, and the competence of a business firm is well categorized in Table 2.

4. Growth Through Competitive Selection

When something radically new is introduced, it almost always occurs through the launching of a new product, the establishment of a new division or through the entry of a new firm. When sufficiently radical, you do not reorganize and accommodate but scrap and establish. A new product may be a complement to existing products or a substitute, in the latter case subjecting existing producers to competition and forcing them to reorganize and/or rationalize, or die (exit). The entry process, hence, is critical for economic growth, pushing performance of the entire industry upwards through the four selection and growth mechanisms ("investments" of Table 3).[5]

Table 3

The four mechanisms of economic growth

1. Entry
2. Reorganization
3. Rationalization
4. Exit (shut down)

Source: G. Eliasson. 1993. "Företagens, Institutionernas Och Marknadernas Roll I Sveriges Ekonomiska Kris (The Role of the Firms, Institutions and Markets in the Swedish Economic Crisis)" Appendix 6 in A. Lindbeck (ed.), *Nya Villkor För Ekonomi Och Politik* (New Conditions for Economic Policy) SOU 1993: 16, pp. 195–233; and G. Eliasson. 1996a, p. 45.

Having said this much we are far outside the domain of WAD theory. We are discovering endogenous organizational change, notably through entry and exit at all levels, as the mover of economic development. We know from a few studies that the productivity effects at the firm level from radical reorganizing are sizable. We know from simulation analyses on a micro-to-macro model approximating the EOE that reorganization and reallocating resources among firms, including new entry and exit, can generate very large long-term effects on economic growth (see further section 7). This is true micro-to-macro dynamics, which will be an even stronger moving force in the "new Internet economy." But things can also be done wrong at all levels, and result in stagnation or decline instead. This means that the selection and allocation to deliver positive growth have to be organized efficiently. This also requires competence.

5. Competence Bloc Theory

Efficient selection means minimizing the incidence of two types of errors (Table 3) (keeping losers on for too long and losing the winners). It is an organizational solution to the allocation of tacit, human-embodied competencies.

The role of competence bloc theory (G. Eliasson and Å. Eliasson 1996, Eliasson 1997a, 1998c) is to explain these competitive selection processes that generate growth in the EOE (Eliasson 1991b, 1996). When efficiently organized, the competence bloc organization minimizes the incidence of the two types of errors. One can also say that increasing returns prevail to search by potential winners. The basic rationale of competence bloc theory is that it is more important economically to do the right things than to do what you do efficiently. Hence, customer satisfaction and (to be shown) customer competence contributions are in focus. While the traditional Walras-Arrow-Debreu model "embodies" only one (optimal) equilibrium solution without choice, the EOE offers an incomprehensible variety of choices and ways of organizing this selection. Competence bloc theory, hence, is an analytical device to explain this organization and the development of an industry driven by the complex interaction of competent actors, the competence of whom to perform particular tasks (functions) cannot be defined (specified) as to content, only be characterized as to results (output). I here outline the characteristics needed and used in this analysis. The minimum set of competent actors of the competence bloc is exhibited in Table 4.

Table 4

Actors in the competence bloc

1. Competent and active **customers**
2. **Innovators** who integrate technologies in new ways
3. **Entrepreneurs** who identify profitable innovations
4. **Competent venture capitalists** who recognize and finance the entrepreneurs
5. **Exit markets** that facilitate ownership change
6. **Industrialists** who take successful innovations to industrial scale production

Source: G. Eliasson and Å. Eliasson. 1996. "The Biotechnological Competence Bloc." *Revue d'Economie Industrielle*, 78, 4^0 Trimestre.

The EOE and competence bloc theory together define the dynamics of endogenous growth. Together, the two explain how the technologies needed to build a new industry are:

- created **(innovation)**
- identified **(recognition)**
- selected (competition)
- commercialized and diffused (**market support**) and
- competently introduced in production (**receiver competence**)

such that the right (product) technology choices are made and the two types of errors (Table 5) are minimized (i.e. to keep losers for too long and to reject winners). In an efficiently organized and well-staffed (with competence) competence bloc, potential winners are exposed to a maximum of varied competencies such that they experience increasing returns to continued search. In the selection process, two types of phenomena appear: synergies and spillovers arise (Eliasson 1997a, 1998b, 1998c); and business mistakes appear as the necessary consequences of a learning process and figure as a standard cost for economic development (Eliasson 1992).

Table 5

The dominant selection problem

Error Type I: Losers kept too long

Error Type II: Winners rejected

Source: G. Eliasson and Å. Eliasson. 1996. "The Biotechnological Competence Bloc." *Revue d'Economie Industrielle*, 78, 4^0 Trimestre.

The innovation and selection process in the competence bloc (through Table 4) is organized as follows:

First, the products chosen or created in the process never get better than what *customers* are capable of appreciating and willing to pay for. The long-term direction of technical change, therefore, is always set by the customers. This is so even though the innovator, entrepreneur or industrialist takes the initiative. But quite often the customer takes the initiative. Technological development, therefore, requires a sophisticated customer base (G. Eliasson and Å. Eliasson, 1996, Eliasson 1998a). In one sense, the customer analysis of competence bloc theory opens up the Keynesian macro demand schedule. But as you peek inside that "black box" you will find that the customer dynamics of the competence bloc has little to do with Keynesian demand. The actors of the competence bloc contribute (commercial) competence in the technological choice process. This argument also serves as a rationale for competent purchasing and acquisitions, including public competent purchasing in areas where goods and services are supplied by public authorities.

Second, basic technology is internationally available, but the capacity to receive it and make a business of it requires local competence. Part of this receiver competence (Eliasson 1987a, 1987b, 1990a, 1996) is the ability to create new winning combinations of old and new technologies (**innovation**). As we know (see e.g. Larsson, Lembre and Mehldal 1998), a rich and varied supply of subcontractor (technology) services is part and parcel of the innovation process.

Third, the task of the **entrepreneur** is to identify commercial winners among the suppliers of innovations and to get his or her choice of technology (**technology choice**) on a commercial footing.

The entrepreneur, however, rarely has resources of one's own to move the project forward. **Fourth**, the entrepreneur, therefore, needs funding from a **competent venture capitalist** (i.e. a provider of risk capital), capable of understanding innovators of radically new technology and able to identify business needs and provide context. The money is the least important thing. **What matters** (Eliasson and Eliasson 1996, Eliasson 1997b) **is the competence to understand and identify winners and, hence, provide reasonably priced equity funding**.[6] The supply of such competent venture capital is extremely scarce. It is the critical part of the overall selection process and, if lacking in performance, is liable to result in the "loss of winners." In fact, **completeness** is a necessary condition for a functioning competence bloc. Making the competence bloc complete must, therefore, be the prime task of industrial policy (Eliasson 2000a). None of the "pillars" (the actors) of the competence bloc can be missing, or the whole incentive structure will fail to develop (G. Eliasson and Å. Eliasson 1996, Eliasson 1998c).

The venture capitalist and his or her escape (**exit**) **market** (**fifth**) are the most important incentive supporting actors. With no understanding of venture capitalists, the price of new capital will be prohibitively high or not available, and winners will be filtered away. With badly functioning exit markets the incentives for venture capitalists will be small and, hence, also for entrepreneurs and innovators. **Completeness** of the competence bloc is, therefore, a necessary requirement for the viable incentive structure that guarantees increasing returns to continued search for winners (i.e. for new industry formation). The venture capital market in Sweden is generally lacking in the industrial competence needed to fund radically new industry (Eliasson 1997b), and even though the exit market situation has been improving, compared to the US, Sweden is still an underdeveloped economy on both counts. Thus, it is very risky to be an innovator and entrepreneur in Sweden, since when the two have exhausted their own resources, there will be no one to turn to except unperceptive bankers, big company executives or public sources, all more or less incompetent in dealing with radically new industrial ventures. The risk is high that winners will get lost.

Finally and **sixth**, when the selection process has run its course and a winner has been selected a new type of industrial competence is needed to take the innovation to industrial scale production and distribution. We cannot tell in advance what the formal role of the industrialist is (CEO, chairman of the Board, an active owner, etc.). The industrialist figures in the competence bloc because of his or her capacity to contribute functional competence. The innovative selection dynamics of the competence bloc is what endogenizes and moves economic growth in the EOE.

It is true that Sweden features an extreme concentration of large-scale business leadership competence (Eliasson 1990b), but this competence has been acquired in traditional mature industries that innovate slowly. The management of innovation in the new type of industries like health care and biotech is radically different from that in mature industries like engineering. The general experience is that leadership competence acquired in traditional industries is of limited use in the radically new industries.

A viable competence bloc now has to exhibit two dominant properties:

1. *Increasing returns to continued search*: (R&D); if a potential winner enters the competition race, continued search (innovation experiments) will result in commercial success.
2. *Sustained incentive*: The competence bloc has to be **complete** to support incentives for such sustained search (**completeness**).

As we have already noted, completeness is a tough requirement. If one link in the experimental selection process of the competence bloc is missing or faulty (e.g. because a competent venture capital industry does not exist), incentives will not be sufficient to stimulate the necessary innovative activity.

These systems properties will exhibit themselves when the competence bloc is complete and when sufficient critical mass has been reached. The competence bloc will then function as an **attractor** such that new entry takes place in such a way:

- that the competence bloc **benefits** from the new entrants, but also (because of competition) such
- that only new entrants that **contribute** to the competence bloc enter and/or survive.

The competence bloc then functions as a technological spillover generator and will begin to develop endogenously through its internal momentum (critical mass).

As a consequence of these synergies and the diversity (pluralism) of approaches and agent representation, the allocation and use of the existing competence mass will be optimized and spillovers will characterize the developing competence bloc. These spillovers will diffuse along many ways and both further reinforce the internal development forces of the bloc and contribute serendipitously to other related and unrelated industries (Eliasson 1997a).

6. Technological Diffusion

The diffusion of new technology occurs along six distinct channels (Table 6): (1) when people with competence move over the labour market, (2) through the establishment of new firms when people with competence leave established firms, (3) through mutual learning among subcontractors and the systems coordinator, (4) when a firm strategically acquires other firms to integrate their particular knowledge with its own competence base, (5) when competitors **imitate** the products of successful and leading firms (the "Japanese approach"), and (6) through organic growth of, and learning in incumbent firms.

Table 6

New technology is diffused

1. When people with competence move (labour market)
2. Through new establishment by people who leave other firms (innovation and entrepreneurship)
3. When subcontractors learn and vice versa (competent purchasing)
4. Technology is acquired through strategic acquisitions of small R&D-intensive firms (strategic acquisitions)
5. When competitors learn from technological leaders (imitation)
6. Through organic growth and learning in incumbent firms

Source: G. Eliasson. 1995. *Teknologigenerator Eller Nationellt Prestigeprojekt? Exemplet Svensk Flygindustry* (A Technology Generator or a National Prestige Project? The Swedish Aircraft Industry). Stockholm: City University Press.

One important insight emerges from a close study of Table 6; efficient diffusion of new technology requires effective market support, notably in the labour market (item 1) but also in the venture capital market and the markets for mergers and acquisitions (M&A). Efficient diffusion is also a necessary condition for spillovers and competence bloc development, but it is not sufficient. For new technology to be introduced in production, **receiver competence** (Eliasson 1987b, 1990a) is needed. Entrepreneurial and venture capital competence are part of this, but the general and rapid introduction of new technology also requires a varied and competent labour force at all levels (workers, engineers, managers and executive people).

When we integrate institutions, incentives and competition into one coherent theory we arrive at the full model of the EOE, featuring growth through innovative competitive selection as in Table 3.[7]

Even though the new growth model is the most sophisticated one of the neoclassical macro growth models, its growth trajectory is still tied to an exogenous moving force. We have demonstrated that micro-to-macro dynamics is not an orderly and predictable development. The theory of the EOE and that of the competence bloc departs from the new growth models in four significant ways: (1) the upper limits of long-term growth are set by the activities of innovators and entrepreneurs, (2) induced by economic incentives and pushed by competition, both factors being ultimately determined by the institutions of society, broadly defined and (3) limited in their performance by their competence to create and to introduce new ideas in production. The EOE finally (4) endogenizes the **time dimension** of the innovation, selection and growth processes. The next section demonstrates, using a model of the EOE, that the institutions regulating incentives and competition, if differently fashioned, can generate enormous differences in long-term macro-economic growth, implying enormous social change. The final section discusses what this implies for policy making and the need for a viable social capital.

7. The Magnitudes Involved – WAD Versus the EOE

The EOE distinguishes itself from WAD theory because of the large dynamic systems effects that occur within firms (hierarchies) and between firms through reorganization (see Table 6). The few quantitative studies carried out show that very large systems effects are potentially achievable within the EOE that are excluded by assumption in the WAD model.

A system is composed of a value or output generating part and a superimposed information (computing/communication/coordinating) system. You may think of (see Eliasson 1990b, p. 57) a factory as being organized by two different information and communications systems; a fully automated and centrally controlled factory, or (alternatively) a completely decentralized system where each skilled worker links to the whole by reading and understanding the blueprints. The decentralized system may even be distributed (outsourced) over a system of subcontractors in the market. In that sense, automating a factory means changing its information system. I have shown elsewhere that this information system does not come free of charge. It, in fact, draws considerable resources, more than 50 percent of the total in the average Swedish manufacturing firm (Eliasson 1990a), and resource use depends on the efficiency of this more or less distributed production organization. It also requires considerable top-level competence to change the information system through reorganization (see Eliasson 1998b, 2000b) and such reorganizing often fails. The normal way to solve business problems, however, is through reorganization (i.e. through changing the "coefficients" of the system and doing things very differently afterwards). In the WAD model, this cannot be done. In terms of the EOE the outcome is close to unpredictable, except that the manager must have a fairly good idea about what he or she wants to achieve to succeed.

As a consequence it is very difficult to study or predict the consequences of organizational change analytically. And few studies have been attempted.

The predictions of the EOE, however, are that radical economic reorganization should be capable of producing very dramatic changes, and the more so the deeper the organization changes go. Generic technologies like the machine tools from the late 18th century, currently complex computer and communications technology, and perhaps in the future biotechnology, also cut deeper than more specific ones. Cutting deeper means making it very profitable to rearrange production flows significantly at the micro level, and this is what we implicitly associate with the Internet or the new economy. Table 7 illustrates in terms of the two "boxes" mentioned above, using IT as an illustration. We first have rationalization measures (items 1 and 2). You can improve total systems performance by speeding up information flows, everything else the same. This was the popular view of IT for a long time. Engineers used CAD equipment as electronic drawing boards. The systems effects were negligible. You can also use the new information technology to speed up physical flows over a given structure. Robotics was the great issue in the early 1980s. Not even combining 1 and 2 (in Table 7) using impressive robots helped much.

Table 7

Systems effect categories at different levels of aggregation in Knowledge-based information economy

1. Speed up info flows over given structures **(rationalization)**
2. Speed up physical flows over given structures **(rationalization)**
3. Reorganize info flows
4. Reorganize physical flows
5. Do all simultaneously **(integrated production)**

Source: G. Eliasson. 1998b. "Information Efficiency, Production Organization and Systems Productivity – Quantifying the Effects of EDI Investments." In Macdonald, Madden and Salama (eds.), *Telecommunications and Socio-Economic Development*. Amsterdam: North-Holland.

The benefits started showing when information and physical flows were decoupled (items 3 and 4) and simultaneously reorganized which became possible with the new C&C technology. Doing only "one" did not help much, but doing it simultaneously (item 5) produced dramatic effects, provided the organizational competence to do it right was in place.

The great industrial potential with the Internet (completely unforeseen some five years ago, see G. Eliasson and Ch. Eliasson 1996) economy appears to be associated with the deep, simultaneous reorganization of both the information and the "production" system (item 5 in Table 7). However, the competence requirements are extremely large and it is no wonder that the enormous investments in IT in the US during all of the 1990s took a long time in exhibiting themselves in the form of positive output effects (Rhodén 1999). Neoclassical macro growth theory explains little of this. Let me illustrate with a few empirical studies.

The first is about automation of an engineering factory (Eliasson 2000b) in which several similar production lines were operated parallel and only some were automated. The factory thus offered an interesting experimental situation. The local engineers decided to organize automation as they themselves saw fit, refusing advice from the parent company which had done the same thing in other factories. One production line was not planned to be automated (to begin with) and another, for specialized production, was to be operated "manually" as before. Without going into details, the two automation investments both failed. The details were not properly attended to in advance, and large costs for adjustment and correction of errors at the end of the production line were incurred.

The automated line, furthermore, lost in flexibility (set-up costs, and rigidity in general) what it gained in increased speed. In the end, the manual production line for customized products exhibited as good productivity performance as the automated lines and at much lower capital costs. This outcome, of course, was neither planned nor necessary. The competence to organize automation right was lacking, and that competence included as well in this particular case, not to do it at all.

The second case is also defined at the firm level and concerns the introduction of an Internet-type technology (EDI) (see Eliasson 1998b) in a distribution network. The case is typical. The study was done at the Royal Institute of Technology (KTH) and the firm instructed the student to look only at item 1 in Table 7. One reason was that the company had recently made a huge investment in a centralized storage capacity. To do anything with EDI beyond item 1 would require that this storage investment be scrapped. We, nevertheless, studied the potential consequences of changes through the whole of Table 7. We found no significant payoffs for the EDI investments until after complete reorganization under item 5. Then the total effect was extremely large and most of it occurred through the removal of the central storage and the associated transactions costs. This study, however, raises the problem of what is intended by a firm in organization based production studies like these. When the great benefits from reorganization under item 5 only occur if reorganization is taken beyond the limits of the firm, into a distributed (over the market) production system, we find ourselves in the midst of a dynamic version of Coasian analysis (Coase 1937). The notion of a firm is no longer clearly defined.

The third case covers the entire manufacturing industry and requires a dynamic micro-to-macro model simulation. Such a model exists in the form of the Swedish micro-to-macro model MOSES (Eliasson 1977, 1991b) that approximates the EOE. We have studied (Eliasson and Taymaz 2000) the very long-term macro-economic consequences of a more or less flexible production organization and its response to external market change (market instability). Flexibility is defined in terms of the rate of entrepreneurial entry, the speed of exit of production units or flexibility of the labour market in terms of enforcing economically motivated reallocation of people. The way the micro-to-macro model is specified makes it reasonable to argue that this flexibility in turn depends on the institutions in the micro-to-macro model of the economy. We cannot claim, however, that the simulations represent what will happen in Sweden, but they tell very realistically the magnitudes involved. There are no particular benefits associated with increased flexibility in terms of exit and labour market mobility if the circumstances are such that they approximate a plannable WAD situation. On the contrary, these small inconsistencies and disturbances of minor significance may generate erratic and erroneous responses that destabilize parts of the micro-to-macro model of the economy. **The effects are very large but take a very long time coming**.

When external circumstances change flexibility becomes important. To generate the desired new production structure needed to cope with the change, new entry of firms is necessary but not sufficient. It has to be supported by sufficient exit of firms and a mobile labour force to make resources available. We have a clear case of Schumpeterian "creative destruction" and an even more clear policy case; supporting the faster death of firms that do not cope. A comparison between US and Europe would be very illustrative here.

There is one additional highlight on EOE versus WAD economics. Long-term growth performance of the entire micro-to-macro model of the economy even improves (somewhat) in the simulation experiments if we change from a plannable WAD regime into an unstable market regime with entry only. There are two explanations. One is technical in the sense that the difference is small and may change sign after another decade of simulations. This is, however, an open question, since the micro-to-macro model of the economy with fully endogenized entry and exit has no prior built-in mechanism that imposes asymptotic convergence. Simulation trajectories might very well continue "diverging forever." There is, however, also an interesting economic explanation. With optimally balanced flexibility in the production system, an unstable market environment may in fact raise the opportunities in the economy compared to the predictable environment, if the actors (firms) are capable of exploiting them, and they are if the production system at large is sufficiently flexible. This exploitation of difficult and hidden opportunities predominantly takes place through new entry. This observation is consistent with Antonov and Trofimov (1993) who find, in experiments on the same model, that long-term performance increases (under an unstable market regime) when decisions are made by actors individually, not being constrained by centrally imposed guidelines, in their case guidelines based on either Keynesian or neoclassical macro-econometric model predictions.

The overall conclusion of the Eliasson and Taymaz (2000) and Antonov and Trofinov (1993) analyses is that **centrally imposed guidelines represent a reduced understanding of the economy** of (all) actors in the markets, or a misunderstanding of the economy compared to the completely decentralized and unregulated decision process where each actor bases its decision on its individual experience and individually conceived future. The optimal collective decision of society is then achieved through decentralized, individual and often inconsistent ("experimental") decisions in the market, each being rational on the basis of its own particular information sets and logic.

Macro models are often designed to give policy advice to government. They achieve clear recommendation by suppressing the role of firm dynamics in the growth process through prior design. This is one message of this paper. Besides not telling much about how growth occurs, neither do such models tell very much about the social consequences of growth, for instance associated with an unpredictable structural adjustment process.

8. Economic Growth, Unpredictable Change and Supporting Social Capital – The Policy Options

The implication of the EOE is that constant and unpredictable change at the micro level is a necessary consequence of steady long-term growth. If society demands growth, it has to accommodate the associated change socially and politically. The empirical evidence presented in the previous section suggests that this change is large in the long run and can be very dramatic also in the short and medium run, notably at local micro levels (Eliasson 1984). Hence, economic progress will subject both firms and human beings to significant, unpredictable and arbitrary change. The ability to cope with that change in a positive way will be a critical economic and social asset. There are also strong implications for industrial and labour market policy. They can be analysed through the use of an appropriately defined concept of social capital. Jozef Ritzen (2001) suggests a narrow and operational definition of social capital that he calls social cohesion that represents the appropriate measure of belongingness for a group of people that we need for a meaningful policy analysis. Social cohesion contributes a private positive utility to its members. Social cohesion tends to be disrupted during periods of more than normal change in the EOE, implying a negative utility experience. This is an unavoidable experience by the individual now and then during a normal growth process. During periods of radical change, for instance during the early phases of the industrial revolution and, perhaps, also during a current possible transition to a new economy, this change with negative utility experiences coupled with great opportunities is likely to be dramatic. It is, therefore, important to be capable of coping with change. And the social capital will have to be part of the support in that respect.

GNP growth is the output of such a process. GNP is not a good measure of well-being for a population; rather it is a measure of the resource flow generated in the economy. Well-being is more a private experience based on the part of the resource flow that becomes available to the individual (Eliasson 1991a, 1994b). To some great extent, then, the individual is privately responsible for his or her well-being, notably through his or her earnings capacity, through arranging for insurance, etc., but also through other personal attributes. So we should continue to be interested in macro-economic growth as defined. How much responsibility should be taken by other people in the group held together by social capital or by government is a matter of institutions in the form of conventions, morals and politics.

Lars Osberg and Andrew Sharpe (2001) want to correct the GNP measure to obtain a better measure of well-being. They correct the GNP measure for three factors; risk (insecurity), distribution and wealth accumulation. (The latter also, of course, has a distributional dimension.) This is when problems begin to enter. The previous analysis has emphasized three supporting factors behind the welfare complex: (1) competence and **education**, (2) flexibility, allocation and the **labour market** and (3) unpredictable and arbitrary change and **insurance**.

Ideally, change and risks should be coped with through insurance, and social insurance as well as regular private insurance developed to serve that purpose. A functioning labour market is also part of the insurance since it facilitates the search for a new job when you have lost one. Finally, however, competence and education run "positively" through both the labour market and the insurance dimensions (Eliasson 1994a, 1994b, 1994c), and it is comforting to observe the strong support from that observation in Wolfe and Haveman (2001). Hence, key to the accumulation of both human and social capital appears to be a factor called "education" broadly defined.

The distributional problem is more difficult to deal with. If your personal well-being (utility) depends on how large a part of the resource flow your neighbour can access relative to yourself, we face an impossible catch 22 problem. Economics has very little to offer here, except referring problems of distribution and fairness to politicians, perhaps suggesting that if you want "more fairness" than the market supplies "you" will have to pay in terms of less growth, everything else the same. Suppose everybody, to feel well, wants to keep the distance downward to his or her less endowed neighbour and catch up or pass in the other direction. Then, we will have a crowd of constantly dissatisfied people, however fast everybody's access to resources grows. The implication may be that total welfare diminishes because policies promote envy.

We have argued already that human and social capital definitions are purpose- and allocation-dependent. To arrive at an operationally meaningful definition of social capital in this context, we want a measure that captures the belongingness discussed above. Such a measure carries positive personal utility and tends to support individual well-being during normal economic change. For our purposes this is enough, except that this measure only covers some of all the dimensions of social capital that have been discussed in the literature. There will be separable dimensions that can be added simply, and there may be integrated dimensions that will be more difficult to deal with analytically.

Already here certain policy conclusions can, however, be drawn. Well-being can be enhanced for each given income stream by (social) insurance. Insurance is also provided through the labour market, partly in the form of job security, partly (and running counter to job security) through easy access to jobs. Another dimension of insurance or personal capacity to cope with almost everything that concerns us is the factor "education" (see Wolfe and Haveman 2001). Educated people tend to have better access to jobs, be more capable of coping with change, be healthier, etc., than less educated people (Wolfe and Haveman 2001, and several other papers). In some ways, apparently, education proxies for the narrowly defined social capital we have discussed, suggesting, on this score, that the policy problem associated with the quality and availability of social capital first becomes focussed on three areas; education, the labour market and (social) insurance. Here, however, we have a paradoxical problem. These three areas are conventionally public responsibilities. They became public policy precincts because the market failed to come up with acceptable solutions. And now we face public failure in these areas of (nowadays) public monopoly. Will politicians be up to this challenging task?

Notes

[1] The 15 largest firms in 1945, 1983 and 1990, together 32, still (1990) account for 33 percent of Swedish exports and almost 50 percent of assets on the Swedish stock exchange (Eliasson and Johansson 1999, pp. 48 ff).

[2] Here I am skeptical about Woolcock's (2001) argument that one should begin with the sources. Defining a general purpose social capital on the basis of presumed sources will make it close to impossible to clarify its functional role in, for instance, the growth process. See Eliasson (1999b) on making intangibles visible and (1994b) on the definition of knowledge capital in economic growth. For instance, on knowledge in general, it becomes too easy to create a prior vision (by assumption) that school (one of many sources) is all that matters for growth when it comes to the knowledge input in the growth process.

[3] Even though unfamiliar to economists, this notion of state space is not new to philosophy (Eliasson 1996, 16 f.). If we define the opportunity set as the total knowledge of all possible, but still unknown contributors of knowledge, we adopt the notion of state space popularized by the philosophers of the age of enlightenment. David Hume and John Locke discussed the world in terms of (1) memory, (2) logics and (3) imagination. Leibniz, however, accepted no more imagination than all possible logical permutations of facts ("memory"; see Eliasson 1996, 16 f.), the reducibility presumption.

[4] The micro-based macro model of the Swedish economy that I will refer to below approximates the EOE.

[5] This reasoning can be nicely illustrated using a Salter (1960) curve. See Eliasson (1996, 44 f.). This is also the way growth occurs in the Swedish micro-to-macro model (Eliasson 1991b). It is particularly important to observe that innovative entry subjects incumbent firms to competition and forces them to respond. The response in the form

of reorganization and rationalization may mean both expansion and contraction depending upon incentives embedded in the institutions of the economy and the individual competence capital of firms.

[6] The venture capitalists also contribute managerial, financing and marketing competence through their network, but this comes later.

[7] As modelled in the Swedish micro-to-macro model MOSES (Eliasson 1977, 1991b). It is obvious that this is very different from the R&D macro production function approach to explaining innovative activity and "endogenizing" economic growth in, for instance, Romer (1990).

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5

The Place of Social Capital in Understanding Social and Economic Outcomes[1]

Michael Woolcock

> It is hardly possible to overrate the value...of placing human beings in contact with persons dissimilar to themselves, and with modes of thought and action unlike those with which they are familiar.... Such communication has always been, and is peculiarly in the present age, one of the primary sources of progress.
>
> — John Stuart Mill

This paper provides a brief introduction to the recent theoretical and empirical literature on social capital as it pertains to economic development issues, with a particular focus on its significance for OECD countries. In so doing it seeks to address three specific questions:

1. How are social capital, human capital and social capability related to one another?
2. How can social capital be measured?
3. How might existing economic growth models give more adequate attention to social capital?

The paper proceeds as follows. I begin by examining the remarkable resurgence of interest in the social dimensions of development in general, and the idea of social capital in particular. This is followed by a basic primer on social capital and a brief survey of the empirical evidence in support of key hypotheses pertaining to economic development, especially the relationship between informal and formal institutions and their collective capacity to manage risk. Next, I provide a response to several of the criticisms levelled at social capital. I then explore the implications of a general theory of social capital for economic growth and well-being in OECD countries. I conclude by calling for a renewed commitment to interdisciplinary and multimethod research on development issues, for keeping debates on social capital focussed on the evidence, and for an appreciation that even a relatively parsimonious conceptualization of social capital has a range of important implications for practitioners and policy makers seeking to cultivate a more productive and inclusive economy.

1. The Decline and Rise of the Social Dimensions of Development

In the last decade, there has been a resurgence of interest in the social and institutional dimensions of economic development (World Bank 1997, 2000a). Work in this field was pioneered by Hirschman (1958) and Adelman and Morris (1967), but in general the issues they had raised so poignantly were crowded out until the late 1980s. During the 1970s and 1980s, Cold War rhetoric and ideological dichotomies (state planning vs. free markets) dominated development discourse in First and Second World countries, while elites in the Third World (and many of their western scholarly counterparts) tended to blame forces beyond their borders for poor domestic performance.[2] For more than 40 years, then, the role of national and local institutions – political, legal and social – were largely neglected.[3] A number of geo-political factors contributed to the turnaround in the 1990s, most prominent among them being the fall of communism, the ostensible difficulties of creating market institutions in transitional economies, the financial crises in Mexico, East Asia, Russia and Brazil, and the enduring scourge of poverty in even the most prosperous economies. Meanwhile, policy makers, foreign investors and aid agencies alike finally began to recognize that corruption, far from "greasing the wheels" in weak institutional environments, was in fact imposing serious and measurable net costs (World Bank 1998). Faced with the glaring evidence that orthodox theories had neither anticipated these difficulties nor offered safe passage through them once encountered, attention returned to the social and institutional aspects.

This was the demand side of the story. On the supply side, a remarkable series of publications combined to give social scientists greater confidence to address these long-neglected themes. In economics, Nobel laureate Douglass North (1990) argued that formal and informal institutions (the legal structures and normative "rules of the game") were crucial to understanding economic performance.[4] In political science, Robert Putnam (1993) showed that the density and scope of local civic associations laid the foundations for the widespread dissemination of information and social trust, thereby creating the conditions underpinning effective governance and economic development (see also Fukuyama 1995).[5] In sociology, Peter Evans (1992, 1995) demonstrated that whether a state was "developmental" or "predatory" was crucially dependent on both the capacity of its public institutions and the nature of state-society relations.[6] By the late 1990s, the development literature on institutional capacity, social networks and community participation inspired by these works began to coalesce around a general framework loosely held together by the idea of "social capital."[7]

2. What Is Social Capital? How Does It Differ from Human Capital and Social Capability?

"It's not what you know, it's **who** you know." This common aphorism sums up much of the conventional wisdom regarding social capital. It is wisdom born of our experience that gaining membership to exclusive clubs requires inside contacts, that close competitions for jobs and contracts are usually won by those with "friends in high places." When we fall upon hard times, we know it is our friends and family who constitute the final "safety net." Conscientious parents devote hours of time to the school board and to helping their kids with homework, only too aware that a child's intelligence and motivation are not enough to ensure a bright future. Less instrumentally, some of our happiest and most rewarding hours are spent talking with neighbours, sharing meals with friends, participating in religious gatherings and volunteering on community projects.

Intuitively, then, the basic idea of "social capital" is that one's family, friends and associates constitute an important asset, one that can be called upon in a crisis, enjoyed for its own sake and/or leveraged for material gain. Those communities endowed with a rich stock of social networks and civic associations will be in a stronger position to confront poverty and vulnerability (Moser 1996; Narayan 1997), resolve disputes (Schafft and Brown 2000) and/or take advantage of new opportunities (Isham 1999). Conversely, the **absence** of social ties can have an equally important impact. Office workers, for example, fear being "left out of the loop" on important decisions; ambitious professionals recognize that getting ahead in a new venture typically requires an active commitment to "networking" (i.e. to creating the social connections they currently lack).

A defining feature of being poor, moreover, is that one is not a member of – or is even actively excluded from – certain social networks and institutions, ones that could be used to secure good jobs and decent housing (Wilson 1996). Without access to employment information networks, residents of inner-city ghettoes find themselves trapped in low-wage jobs (Loury 1977); diffuse sets of social ties are crucial to the provision of informal insurance mechanisms (Coate and Ravallion 1993; Townsend 1994). Similarly, Varshney (2000) shows that where there are cross-cutting ties to connect different groups, such as associations that bring together Hindus and Muslims in India, conflict is addressed constructively and rarely descends into violence; where such ties are lacking, there are no established channels for dealing with difference. Barr (1998) reports similar findings from work on firms in Africa, where poor entrepreneurs are shown to have a limited and circumscribed set of "protection" networks, while the non-poor have a more diverse set of "innovation" networks (see also Fafchamps and Minten 1999). There is also anecdotal evidence to suggest that in many poor communities, women primarily possess the intensive "protection" networks, while men have access to more extensive "innovation" networks (Goldstein 1999).

Intuition and everyday language also recognize an additional feature of social capital, however. They acknowledge that social capital has costs as well as benefits, that social ties can be a liability as well as an asset.[8] Most parents, for example, worry their teenage children will "fall in with the wrong crowd," that peer pressure and a strong desire for acceptance will induce them to take up harmful habits. At the institutional level, many countries and organizations (including the World Bank) have nepotism laws, in explicit recognition that personal connections can be used to unfairly discriminate, distort and corrupt. In our everyday language and life experiences, in short, we find that the social ties we have can be both a blessing and a blight, while those we do not have can deny us access to key resources. These features of social capital are well documented by the empirical evidence, and have important implications for economic development and poverty reduction.

The most compelling empirical evidence in support of the social capital thesis comes from household and community level (i.e. "micro") studies, drawing on sophisticated measures of community networks, the nature and extent of civic participation, and exchanges among neighbours. In the OECD countries, the most comprehensive findings have emerged from urban studies (e.g. Gittell and Vidal 1998; Sampson, Morenhoff and Earls 1999), public health (Kawachi and Berkman 2000; Kawachi, Kennedy and Glass 1999) and corporate life (Burt 2000; Fernandez, Castilla and Moore 2000; Meyerson 1994), the unifying argument being that, controlling for other key variables, the well connected are more likely to be hired, housed, healthy and happy. Specifically, they are more likely to be promoted faster, receive higher salaries, be favourably evaluated by peers, miss fewer days of work, live longer, and be more efficient in completing assigned tasks. An increasingly large number of studies – drawing on an intellectual tradition going back to Smith and Marshall – also explore the role of "communities of practice" within and strategic alliances between firms, especially in the finance, biotechnology and software industries (e.g. Lesser 2000; Wenger and Snyder 2000). To the extent that local and regional growth performance is driven by these types of alliances, innovative policies to facilitate their emergence need to be given serious consideration.

Social capital has entered debates about economic performance on its ambitious claim to constituting an independent – and hitherto under-appreciated – factor of production. The classical economists identified land, labour and **physical** capital (i.e. tools and technology) as the three basic factors shaping economic growth, to which in the 1960s neo-classical economists such as T. W. Schultz (1961) and Gary Becker (1962) introduced the notion of **human** capital, arguing that a society's endowment of educated, trained and healthy workers determined how productively the orthodox factors could be utilized. The latest equipment and most innovative ideas in the hands or mind of the brightest, fittest person, however, will amount to little unless that person also has access to others to inform, correct, improve and disseminate his or her work. Life at home, in the boardroom or on the shop floor is both more rewarding and productive when suppliers, colleagues and clients alike are able to combine their particular skills and resources in a spirit of cooperation and commitment to common objectives. In essence, where human capital resides in individuals, social capital resides in relationships. Human and social capital are complements, however, in that literate and informed citizens are better able to organize, evaluate conflicting information and express their views in constructive ways. Schools which are an integral part of community life (Hanifan 1916), nurture high parental involvement (Coleman 1988) and actively expand the horizons of students (Morgan and Sorensen 1999) are more likely to help students achieve higher test scores.

Much of the interest in social capital among economists, however, has been fueled by a definition that includes not only the structure of networks and social relations, but more individualistic behavioural dispositions (such as trust, reciprocity, social skills [Glaeser, Laibson, and Sacerdote 2000]), and macro-institutional quality measures ("rule of law," "contract enforceability," "civil liberties," etc.).[9] This more all-encompassing approach is appealing to some because of the existence of large, cross-national datasets (e.g. the World Values Survey, Gastil indexes, Freedom House scores), which permit "social capital" – now measured by country-level "trust" and "governance" scores – to be entered into macro-economic growth regressions.[10] Such studies make for provocative reading, but the collective panoply of micro and macro measures of "social capital"[11] – and their correspondingly eclectic theoretical frameworks – has led many critics to accuse social capital of having become all things to all people, and hence nothing to anyone.

What to do? One approach has been to refer to macro-institutional issues under a separate banner, calling them instead "social capabilities," "social cohesion" or "social infrastructure" (e.g. Hall and Jones 1999; Koo and Perkins 1995; Ritzen, Easterly and Woolcock 2000; Temple and Johnson 1998). The virtue of this strategy is that it relieves social capital of its mounting intellectual burden, analytically and empirically disentangling micro-community and macro-institutional concerns. The vice is that it removes a convenient discursive shorthand for the social dimensions of development vis-à-vis other factors of production (cf. "human capital," "financial capital"), and treats as separate what is more accurately considered together (see below).

A second approach has been to call for an exclusively relational definition of social capital (Portes 1998; Putnam 2000), to advocate for a "lean and mean" conceptualization focussing on the **sources** of social capital (i.e. primarily social networks) rather than its **consequences** (which can be either positive or negative, depending on the circumstances), such as trust, tolerance and cooperation. The upside of this approach is that it is more or less clear about what is, and what is not, social capital, making for cleaner measurement and more parsimonious theory building; the downside is that it tends to overlook the broader institutional environment in which communities are inherently embedded.

A third approach has been to dismiss the definitional debate altogether. For researchers such as Knack (1999b), it is a moot question as to whether social capital is, or should be understood as, a micro or macro phenomenon: "social capital **is** what social capital scholars **do**." Just as social scientists do important and rigorous work on "power," "class" and "sustainability" without universally agreed-upon definitions of them, so too, these writers maintain, we should care less about parsing terms and more about applying consistent scholarly standards to evaluating the merits of research on "social capital." If the work satisfies rigorous methodological, empirical and theoretical criteria, then definitional issues will take care of themselves.

So is social capital a micro-community phenomenon, a macro-institutional phenomenon, both, or does it not matter? My own approach to these concerns, first outlined in Woolcock (1998), has been to acknowledge the merits of each approach, and to attempt something of a synthesis. The core components of my approach are the following. First, we do need a definition, and one that is more or less agreed upon. I, therefore, reject the "anything goes" argument while wholeheartedly agreeing that all research should be subject to consistent and rigorous scholarly standards. A definition is needed because social capital is being used in so many different disciplines; far from precluding agreement, it is remarkable how much overlap there actually is, presenting us with a timely opportunity to adopt a concept that transcends familiar disciplinary provincialisms. Definitional debates have been going on for the best part of a decade now, and lest they continue to absorb time and resources best spent on more important issues, I am prepared to declare that while the battles are not over, the war has essentially been won. There is an emerging consensus on the definition of social capital, one built on an increasingly solid empirical foundation, and it is as follows: social capital refers to the norms and networks that facilitate collective action.

Second, to avoid tautological reasoning, I maintain that any definition of social capital should focus on its sources rather than consequences, on what it **is** rather than what it **does** (Edwards and Foley 1997). (Without this distinction, as Portes [1998] points out, an argument could be put forward that successful groups were distinguished by their dense community ties, failing to consider the possibility that the same ties could be **preventing** success in another otherwise similar group.) This approach eliminates an entity such as "trust," a vitally important entity in its own right but which for our present purposes can be regarded as an outcome (of repeated interactions, of credible legal institutions, of reputations). Just as "test scores" are an indicator of human capital, and not human capital itself - individuals and governments invest in schools that are the source of human capital, not test scores, which are an outcome - so too "trust" is better understood not as social capital per se, but rather as a measure of it. We invest in the networks and social institutions that produce trust, not trust in and of itself.

Third, for clarity's sake, social capital makes most sense when it is understood as a relational (i.e. sociological), rather than psychological[12] or political variable.[13] (Having said that, I think there **is** a sense in which the spirit of social capital can be applied to broader political economy concerns, and I discuss this below.) If we are to be true to the dictums of scholarship - namely, that the reliability and validity of data (whether qualitative or quantitative), its analysis and interpretation, constitute the central focus of our deliberations - then the broader definition is becoming increasingly untenable, because the best and most coherent empirical research on social capital, **irrespective of discipline**, has operationalized it as a sociological variable (see Foley and Edwards 1999). Furthermore, if "social capital" is facile or distracting, as some (e.g. Fine 1999) maintain, then this too should be demonstrated empirically, not refuted polemically. Given the ever-accumulating weight of evidence documenting the significance of social capital, however, the burden of proof is rapidly shifting to the detractors. A virtue of adopting a relatively narrow definition is that it encourages supporters and sceptics alike to play by the same rules. Importantly, it also enables us to rule **in** a century's worth of research on neighbourhood and community effects that, while not employing the social capital terminology per se, is entirely consistent with the spirit of it.

Fourth, in order to accommodate the range of outcomes associated with social capital, it is necessary to recognize the multidimensional nature of its sources. The most common and popular distinction - drawing on Cooley's (1909) notion of primary (and, by implication, secondary) groups, and Granovetter's (1973) work on "strong" and "weak" ties - is between "bonding" and "bridging" social capital (Gittell and Vidal 1998, p. 10). The former refers to relations between family members, close friends and neighbours, the latter to more distant friends, associates and colleagues. Bridging is essentially a horizontal metaphor, however, implying connections between people who share broadly similar demographic characteristics. As Fox (1996) and Heller (1996) have stressed, social capital also has a vertical dimension. Poverty is largely a function of powerlessness and exclusion, and because of that a key task for development practitioners and policy makers is ensuring that the activities of the poor not only "reach out," but are also "scaled up" (Uvin 1995; Uvin, Jain and Brown 2000). An important component of this strategy entails forging alliances with sympathetic individuals in positions of power (Brown and Fox 1998), an approach Hirschman (1968) wryly calls "reform by stealth." To further extend the Hirschmanian discourse, this vertical dimension can be called "linkages." The capacity to leverage resources, ideas and information from formal institutions beyond the community is a key function of linking social capital (World Bank 2000b).

A multidimensional approach allows us to argue that it is different **combinations** of bonding, bridging and linking social capital that are responsible for the range of outcomes we observe in the literature, and to incorporate a dynamic component in which optimal combinations change over time. These distinctions have particular significance for understanding the plight of the poor, who typically have a close-knit and intensive stock of bonding social capital that they leverage to "get by" (Briggs 1998; Bebbington 1999), a modest endowment of the more diffuse and extensive bridging social capital typically deployed by the non-poor to "get ahead" (Barr 1998; Narayan 1999; Kozel and Parker 2000), and almost no linking social capital enabling them to gain sustained access to formal institutions such as banks, insurance agencies and the courts (see World Bank 2000b, Chapter 7).

Fifth, it is important to stress that a narrowly sociological definition of social capital (i.e. one centred on networks within, between and beyond communities) must not blind us to the institutional context within which these networks are embedded, especially the role of the state. Indeed, I contend that the vibrancy or paucity of social capital cannot be understood independently of its broader institutional environment: communities can be highly engaged because they are mistreated or ignored by public institutions (e.g. providing credit and security because banks and police refuse to do so), or because they enjoy highly complementary relations with the state. As a number of economists and anthropologists have noted (e.g. Besley and Coate 1995; Davis 1999), the absence or weakness of formal institutions is often compensated for by the creation of informal organizations (Narayan 1999). As such, I caution against explanations of the rise and fall of social capital – and policy arguments for enhancing or reviving it – that occur in an institutional vacuum. Weak, hostile or indifferent governments have a profoundly different effect on community life (and development projects), for example, than governments that respect civil liberties, uphold the rule of law and resist corruption (Kaufmann, Kraay and Zoido-Lobaton 1999a,1999b).

This is especially the case in developing countries, but the same principle holds for OECD countries, especially for understanding the plight of minorities and marginalized groups (e.g. illegal immigrants, the poor). It is also important when it comes to understanding problematic social issues such as "ethno-linguistic fractionalization," which some (e.g. Easterly and Levine 1997) have argued is a significant source of economic stagnation. The most recent work, by Collier (1999), Posner (2000) and Easterly (2000b), however, argues that high levels of ethnic fractionalization per se are in fact not a concern (indeed, diversity can be a asset); rather, it is the presence of two or three large competing ethnic groups **coupled with weak public institutions** that spells danger. This explains in part why ethnically heterogeneous societies like the US, Canada, the UK and Australia (and OECD countries in general) have been able to enjoy the fruits of their diversity.

3. Responding to the Critics

The broad popularity and policy influence of social capital has, not surprisingly, met with a backlash in some quarters. In addition to concerns about conceptual overreach and lack of empirical specificity discussed above, a number of other questions have been raised. Some of these are legitimate, of course, and need to be addressed, since no idea or agenda is well served by advocates who fail to take stock on a regular basis, who romanticize community, or who do not acknowledge and attend to weaknesses. Many of these concerns are simply unfounded, however, or at least do not constitute grounds for dismissal. In this section, I outline and respond to six issues raised by the critics.

Social capital is flawed, say the critics, because it:

a. *Just repackages old ideas: is more style (good "marketing") than substance*

The "good marketing" aspect of this claim is true, but that does not make it a flaw. The hype surrounding social capital, like any "product," would have collapsed under its own weight long ago if there was no sufficiently rigorous empirical foundation on which it was built, and if a broad constituency of people did not "buy it." But the foundation is strong and expanding, and the audience wide and deep. Sociology for too long has been content to let its key ideas trade under obscure, jargon-laden terminology that has little resonance with other disciplines or (more importantly) the general public. The idea of social capital is at heart a pretty simple and intuitive one, and it consequently speaks to a lot of different people. Without unduly compromising itself, the idea of social capital gives classical (and contemporary) sociological themes a voice they would not otherwise have.

b. Is merely the latest social scientific fad/buzz word

The downside of successfully "marketing" a new but still imprecise idea is that a lot of people try to ride its coattails. Such people seek to procure credibility for their work by calling what they do "social capital research," even if they have only a passing knowledge of how most others have used the term. Repeated too many times, it creates a situation where social capital does indeed appear to be "all things to all people." Although the number of studies continues to expand exponentially, a coherent and rigorous core is emerging. As a consensus (of sorts) is reached about its definition and theoretical underpinnings, the difference between the contenders and pretenders will become much clearer. It is important to note that there is also a "demand side" component to social capital's recent popularity, in that it satisfies a conceptual void in both mainstream economic and social theories of development about how to deal seriously with "the social dimensions." As long as that void exists, and as long as the idea of social capital can convincingly fill it, the buzz should be welcomed, not scorned.

c. Encourages and rewards "economic imperialism" (social relations as "capital"?)

The idea of social capital has been developed primarily by economic sociologists, and as such provides equal opportunity for both sociological and economic "imperialism" (or economic rationalism, as it is called in Australia). In the end, however, I am not convinced that any kind of imperialism is really all that bad in either direction. Disciplines should have the confidence of their convictions; there are no laws saying who can or should study what subject with what tool kit, and the prize should go to those who provide the most compelling answers to the most important questions. To the extent we live in a world where the dominant ideas – in both popular discourse and public policy – are those of economics, we should welcome windows of opportunity for modifying the more extreme elements of those ideas, and having a concrete alternative to those ideas. To talk of social relations as "capital," for example, is not sociological heresy or a sell-out to economics: it simply reflects the reality that our social relationships are one of the ways in which we cope with uncertainty (returning to our family when we lose our job), extend our interests (using alumni networks to secure a good job), realize our aspirations, and achieve outcomes we could not attain on our own (organizing a parade). Perhaps social capital's greatest quality, however, is that it helps transcend the imperialism wars altogether, providing a common discourse across disciplinary, sectoral and methodological divides.

d. *Reinforces or legitimizes orthodox ("Washington consensus"[14]) development policies*
This is a recent but largely spurious critique, in that it denies and masks the very real changes in the way development theory and practice is being conducted today at the major development organizations, especially when compared with those of a decade ago (World Bank 2000b), and fails to recognize that social capital theory can be a powerful tool for explaining how and why certain power structures themselves are established and perpetuated. The idea of social capital is not entirely value neutral (no idea is), but seen as a complement of physical capital (tools and resources), financial capital (monetary assets) and human capital (education and health), it can forge an important conceptual space for taking the social dimension seriously. In this light, the perpetuation or decline of (neo-) "Washington consensus" development policies is shaped by a much larger constellation of forces. Social capital should be seen as part of the solution, not the problem, for those with a legitimate axe to grind about the bad old days of development. Importantly, social capital is facilitating sociology's entry into high-level policy discussions – an arena from which it has been comfortably excluded until now – giving the discipline the chance to have a real influence on issues it claims to care deeply about.

e. *Neglects considerations of power, especially for those who are relatively powerless*
Social capital has been appropriated by scholars, activists and policy makers spanning the political spectrum (an interesting fact in and of itself), so it is possible to read the literature selectively and arrive at the above conclusion. A more complete reading, however, reveals that a social capital perspective can be used not only to help explain the emergence and persistence of power relations, but – perhaps more important – to provide a constructive basis for doing something about it. It is one thing to recognize, for example, that poverty is caused in part by the exclusion of certain marginalized groups from public, private and civic institutions; it is quite another to say what should happen next. Marxist theory predicts and promotes revolution, on an assumption of shared interests among disenfranchised groups; neo-classical theory assumes markets (formal and informal) will emerge of their own accord to reach an efficient equilibrium;

modernization theory advocates the wholesale transformation of all traditional social relationships if greater prosperity is to be attained. At its best, a social capital perspective recognizes that exclusion from economic and political institutions is created and maintained by powerful vested interests, but that marginalized groups themselves possess unique social resources that can be used as a basis for overcoming that exclusion, and as a mechanism for helping forge access to these institutions. Intermediaries such as non-governmental organizations have a crucial role to play in such a process, because it takes a long time to earn both the confidence of the marginalized, and the respect of institutional gatekeepers. In short, it takes an articulated effort of both "top-down" and "bottom-up" to help overcome this exclusion, but it can be, has been and is being done, with positive and lasting results.

f. *Is a Western (especially US) concept supported by Western research, with little relevance elsewhere*

All ideas are grounded in language and history, and for whatever reason, we find ourselves living at a time when most of the best social science departments in the most prestigious (and well-funded) universities happen to reside in the Western world. For better or worse, "social capital" is an idea that has emerged from this milieu, but one of the reasons for grounding our understanding of it in "intuition" (as well as empirical research) is that it is the basic intuition, not the precise words or formal definition, that travels best across time, space and circumstance. The words "social capital" translate poorly into many European languages, let alone Asian or African ones, but everything from individual PhD dissertations to multimillion dollar cross-national research projects are being carried out in its name, producing remarkably complementary findings: high quality social capital research has been carried out in countries as different as India, Togo, Haiti, Italy and Canada. All social scientific words suffer translational problems – the idea of a "household" or "neighbourhood" does not even exist in some languages – but that is no reason not to search for creative and culturally appropriate solutions.

4. Social Capital and Models of Economic Growth – Getting the Social Relations Right

This conceptualization of the role of different types and combinations of social networks in development represents an important departure from earlier theoretical approaches, and therefore has important implications for contemporary development research and policy. To see why, it is instructive to briefly review those theories.

Until the 1990s, the major theories of development held rather narrow, even contradictory, views of the role of social relationships in economic development, and offered little by way of constructive policy recommendations. In the 1950s and 1960s, for example, modernization theory regarded traditional social relationships and ways of life as an impediment to development. When modernization theorists explained "the absence or failure of capitalism," Moore (1997, p. 289) correctly notes, "the focus [was] on social relations as obstacles." An influential United Nations (1951) document of the time encapsulated this view: for development to proceed, it proclaimed,

> ancient philosophies have to be scrapped; old social institutions have to disintegrate; bonds of caste, creed and race have to burst; and large numbers of persons who cannot keep up with progress have to have their expectations of a comfortable life frustrated.
>
> (cited in Escobar 1995, p. 3)

This view gave way in the 1970s to the arguments of dependency and world-systems theorists, who held social relations among corporate and political elites to be a primary mechanism of capitalist exploitation. The social characteristics of poor countries and communities were defined almost exclusively in terms of their relations to the means of production, and the inherent antipathy between the interests of capital and labour. Little mention was made of the possibility (or desirability) of mutually beneficial relationships between workers and owners, of the tremendous variation in success enjoyed by developing countries, or of political strategies other than "revolution" by which the poor could improve their lot. Communitarian perspectives,[15] on the other hand, with their emphasis on the inherent beneficence and self-sufficiency of local communities, underestimated the negative aspects of communal obligations, overestimated the virtues of isolation, and neglected the importance of social relations to constructing effective formal institutions. For their part, neo-classical and public choice theories – the most influential in the 1980s and early 1990s – assigned no distinctive properties to social relations per se. These perspectives focussed on the strategic choices of rational individuals interacting under various time, budgetary and legal constraints, holding that groups (including firms) existed primarily to lower the transactions costs of exchange; given undistorted market signals, the optimal size and combination of groups would duly emerge. "Selecting incentives" and third-party enforcement were needed where markets failed to ensure that groups acted to serve collective interests.

For the major development theories, then, social relations have been construed as singularly burdensome, exploitative, liberating or irrelevant. Reality, unfortunately, does not conform so neatly to these descriptions and their corresponding policy prescriptions. Events in the post-Cold War era – from ethnic violence and civil war to financial crises and the acknowledgement of widespread corruption – have demanded a more sophisticated appraisal of the virtues, vices and vicissitudes of "the social dimension" as it pertains to the wealth and poverty of nations.

The social capital literature, in its broadest sense, represents a first approximation to the answer to this challenge. It is a literature to which all the social science disciplines have contributed, and it is beginning to generate a remarkable consensus regarding the role and importance of institutions and communities in development. Indeed, one of the primary benefits of the idea of social capital is that it is allowing scholars, policy makers and practitioners from different disciplines to enjoy an unprecedented level of cooperation and dialogue (Brown 1998; Brown and Ashman 1996). In reviving and revitalizing mainstream sociological insights, there has been a corresponding appreciation that different disciplines have a vital, distinctive and frequently complementary contribution to offer to inherently complex problems. Another distinctive feature of the social capital approach is its approach to understanding poverty. Living on the margins of existence, the social capital of the poor is the one asset they can potentially draw upon to help negotiate their way through an unpredictable and unforgiving world. As Dordick (1997) astutely notes, the very poor have "something left to lose," namely each other. While much of the discourse surrounding poor people, poor communities and poor economies is one of "deficits," a virtue of the social capital perspective is that it allows theorists, policy makers and practitioners to take an approach that recognizes important "assets."

If, as I have argued, we should adopt a relatively narrow sociological definition of social capital, but understand it as inherently embedded in an institutional context, where does this leave us in terms of applying social capital to questions of economic growth? What relevance does a social theory of norms and networks have for minders of regional and national economic performance in OECD countries?

This question can be answered in a number of ways, but I will identify four. The first is that social capital, so understood, should mind its own business, focus on communities and leave macro-economic concerns to the experts. A second response is to search for existing proxies for network size and structure, and simply "add" them to the catalogue of other variables deemed significant for growth. A third answer is to do the hard work of integrating serious qualitative and quantitative research strategies into the design of comprehensive new instruments to more accurately measure social capital. A fourth strategy is to take the central ideas underlying the social capital perspective (the "spirit" of social capital, if you will), and apply them in innovative ways to broader issues of political economy. Of these answers, the first is overly modest, the second overly ambitious. The third is a desirable long-run objective, the fourth an intriguing possibility with more immediate returns. Needless to say, I cast my lot with champions of answers three and four. In the remaining space, let me sketch out these positions in further detail.

Toward New, Better, More Comprehensive Measures

For social capital to become a serious indicator of regional and national well-being, measures of it need to be drawn from large representative samples, using indicators that have been pretested and refined for their suitability. Such efforts are under way in a number of countries, with the distinct possibility that social capital questions may soon be included in the census of several OECD countries. In developing countries such as Guatemala, the highly acclaimed Living Standards Measurement Survey (LSMS) – the standard bearer for high quality household data on income, expenditure, health and education – is about to incorporate a social capital module, the first of its kind. Just as this survey will enable us to make reliable national-level estimates of the levels of poverty, education and health, so too will it provide more or less comparable data on social capital. The quantitative measures to be gleaned from this survey of more than 9,000 representative households will be complemented by a major qualitative analysis at the village level. Armed with data of this scale and quality, there is a strong possibility that social capital will soon be "mainstreamed" into the range of familiar economic measures used to take the pulse of society (unemployment rates, consumer price indexes, inflation levels, and the like).

It is important to stress that, while gathering "hard data" is indispensable, the qualitative aspects of social capital should not be neglected. In many respects, it is something of a contradiction in terms to argue that universal measures can be used to capture local idiosyncratic realities. At a minimum, this means that the construction of survey instruments to measure social capital should follow intensive periods in the field, ascertaining the most appropriate way to ask the necessary questions. This has been a feature of the work of the Sagauro Seminar at Harvard University studying social capital in the US, and more modestly, of my own efforts (with Vijayendra Rao and colleagues at the Institute for Economic Growth in Delhi) to understand the risk management functions of social capital in the slums of Delhi (see Coutinho, Rao and Woolcock, 2000). In an age of electronic communications and busy schedules, it is all too easy to download other people's surveys, append them to your own and march off to the field with noble intentions. Previous efforts should be a guide to, but not a substitute for, doing the hard work that social capital research entails. Furthermore, social capital theory stresses "processes" (means) as much as it does "products" (ends), and qualitative methods provide especially fruitful techniques for unpacking the mechanisms behind those processes. Clean models and dirty hands are both required (cf. Hirsch, Michaels and Friedman 1990).

Incorporating the Spirit of Social Capital into Political Economy and Public Policy

The policy response to reading the social capital literature should not be a call for more choirs and soccer clubs, as writers satirizing Putnam (1993) have tended to infer. Social capital is not a panacea, and more of it is not necessarily better. But the broader message rippling through the social capital literature is that how we associate with each other, and on what terms, has enormous implications for our well-being, whether we live in rich or poor countries. As such, a number of important findings that have recently emerged independently from the political economy literature, though they (rightly) avoid the social capital terminology, are entirely consistent with the emerging social capital perspective.

To see why, recall the three dimensions of social capital outlined above, and my insistence that they be understood in the context of their institutional environment. If it is true that meager stocks of bridging social capital make it more difficult for ideas, information and resources to circulate between groups, then it follows that larger economic, social and political forces that divide societies will be harmful for growth. Economic inequality, and overt discrimination along gender and ethnic lines, for example, should be harmful to growth. Similarly, if leveraging social capital is an important risk management strategy during times of economic distress (e.g. losing a job, enduring crop failure, suffering a prolonged illness), it follows that divided societies will experience greater difficulty managing economic shocks. Moreover, my emphasis on understanding the efficacy of social capital in its institutional context implies that how communities manage both opportunities and risk will be necessarily dependent on the quality of the institutions under which they live. Rampant corruption, frustrating bureaucratic delays, suppressed civil liberties, failure to safeguard property rights and uphold the rule of law forces communities to supply privately and informally what should be delivered publicly and formally. Accordingly, in countries where these conditions prevail, there should be little to show for even the most well-intentioned efforts to build schools, hospitals and encourage foreign investment.

Recent work by Dani Rodrik (1999a, 1999b) and William Easterly (2000a) provides powerful econometric evidence in support of the idea that economic growth in general, and the ability to manage shocks in particular, is the twin product of coherent public institutions **and** societies able to generate what Easterly calls a "middle class consensus."

Countries with divided societies (along ethnic and economic lines) **and** weak, hostile or corrupt governments are especially prone to a growth collapse. When shocks hit – as they did in the mid-1970s and early 1980s – these countries proved unable and/or unwilling to make the necessary adjustments. Lacking well-established precedents, procedures and institutional resources for managing conflict, these economies experienced a major growth collapse from which some have still not recovered (see below).[16]

For students of economic growth in the 1960s, as Rodrik (1999a) correctly notes, it was hard to adjudicate between the merits of different strategies, as all economies – open/closed, natural resources/manufacturing, landlocked/coastal, temperate/tropical, large/small – did relatively well. The real test came with the oil crises of the 1970s and the global recession of the early 1980s, which produced a growth collapse in the developing economies of "Grand Canyon" proportions, one that did not end until the mid-1990s. The devastating growth collapse of 1975 to 1995 cost the average person in the typical developing country around $2,000,[17] and set back by at least a decade the level of economic development that would have been attained had the 1955 to 1974 growth trajectory been maintained. By comparison, the recent Asian financial crisis will appear as temporary, localized and relatively minor. The OECD nations also suffered a growth collapse in the late 1970s/early 1980s; they recovered relatively quickly, but have returned to modest growth rate levels more commensurate with their history. (Importantly, the prospects of poor nations seem to be heavily dependent on the performance of OECD nations [Easterly 2000c].)

So, while social capital scholarship per se is surely on the safest ground when it speaks to community development issues, the spirit of social capital is also consistent with findings now emerging in studies of macro-economic growth. It is in this sense that I think social research on economic issues and economic research on social issues is reaching a remarkable – but largely unacknowledged – consensus. More dialogue and diplomacy among social scientists, rather than perennial civil war, might enable us to harness these collective insights in the joint pursuit of a more productive and inclusive global economy.

5. Conclusion

For both countries and communities, then, rich and poor alike, managing risk, shocks and opportunities is a key ingredient in the quest to achieve sustainable economic development. Whether shocks manifest themselves as trade declines, natural disasters, strikes, disputes over access to water, domestic violence or the death of a spouse, those able to weather the storm will be those that are more likely to prosper. A social capital perspective seeks to go beyond primordial "cultural explanations" for these different response strategies, to look instead for structural and relational features. Development is more than just a matter of playing good "defence" (or "getting by"), however; it also entails knowing how to initiate and maintain strategic "offence" ("getting ahead"). From large public–private partnerships (Tendler 1995) to village-level development programs (Bebbington and Carroll 2000), success turns on the extent to which ways and means can be found to forge mutually beneficial and accountable ties between different agents and agencies of expertise. It is in this sense that I argue that "getting the social relations right" (Woolcock 2001) is a crucial component of both the means and ends of development. If the idea and the ideals of social capital help move us in this direction – and does so by encouraging and rewarding greater cross-fertilization between disciplines and methodologies, and between scholars and policy makers[18] – then it more than justifies its place in the new development lexicon.

Notes

[1] This paper draws on Woolcock (2000) and Woolcock and Narayan (2000).

[2] To be sure, the power of wealthy nations, corporations and individuals to exert a disproportionate degree of influence in developing countries remains an important issue, but in the 1960s, 1970s and 1980s the myopic focus by dependency theorists on these "external forces" trumped most serious efforts to examine "internal conditions." Modernization theorists raised some of these concerns, but largely in unhelpful ways (e.g. examining national or ethnic "cultural traits" or levels of "achievement motivation") which they believed were reflected in patterns and degrees of development. For a review of the more recent literature on culture and development, see Alkire, Rao and Woolcock (2000).

[3] Even today, it is the rare development economics textbook that contains a single index entry for "institutions," "communities" or even "corruption." "Governments," where discussed at all, are usually portrayed as rent-seeking and/or price-distorting entities capable of few positive or proactive contributions to society other than the provision or protection of essential public goods.

[4] The pioneering work of Joseph Stiglitz, Amartya Sen and Mancur Olson on (respectively) incomplete information, human development and institutional rigidities was also influential (see, only most recently, Stiglitz 1998, Sen 1999 and Olson 2000).

[5] Elinor Ostrom (1990) and Norman Uphoff (1992) also made influential contributions through their work on the importance of social relations to the maintenance of common property resources (especially the management of watersheds in developing countries).

[6] For comparable innovative work in anthropology, see Singerman (1995) and Ensminger (1996).

[7] See Woolcock (1998) for an overview of the intellectual history of social capital. Extensive social capital citations in fields other than development are presented in Woolcock (1998) and Foley and Edwards (1999).

[8] Indeed, an early criticism of the social capital literature was that it failed to appreciate the forms and consequences of these costs. For members of cults, for example, group loyalties may be so binding that attempts to leave result in death; some successful members of immigrant communities have reportedly Anglicized their names in order to divest themselves of obligations to support subsequent cohorts (Portes and Sensenbrenner 1993). More onerously, the destructive acts of hate groups, drug cartels and terrorist organizations may impose enormous burdens on society as a whole (Rubio 1997).

[9] See Temple (2001) for a review of this latter literature.

[10] See, among others, Collier and Gunning 1999; Knack 1999a; Knack and Keefer 1997; La Porta et al. 1997.

[11] For a summary of various measures of social capital, see Grootaert (1997), Box 3.

[12] Cf. Krishna and Uphoff's (1999) distinction between "cogitive" and "structural" social capital. Glaeser, Laibson and Sacerdote's (2000) rendering of social capital is also essentially psychological (i.e. individualistic and behavioural).

[13] A relatively narrow definition of social capital does not preclude cross-country comparisons, but the reality is that we simply do not have the data we need at this time to make meaningful statements. I discuss this aspect in more detail below.

[14] The "Washington consensus" is a phrase coined by John Williamson (1993) to refer to the common elements of structural adjustment packages unilaterally offered to developing countries by the major multilateral development agencies. The essential elements are trade openness, privatization of state-owned industries, macro-economic stability, currency convertibility and low inflation.

[15] This perspective encapsulates the views of the Independent Commission of the South (1990) and Etzioni (1994), among others. On the doctrine of self-reliance, a key theme of communitarians, see Rist (1997, Chapter 8).

[16] For recent related work on the importance of governance and bureaucratic structures for development, see Campos and Nugent (1999), Evans and Rauch (1999), Kaufmann, Kraay, and Zoido-Lobaton (1999a, 1999b), La Porta et al. (1998), Rauch and Evans (2000) and Tendler (1997). For early work relating social capital to growth, see Helliwell and Putnam (1995).

[17] This figure represents the difference between the growth rates that prevailed during the 1975–1995 period, and the 2.35 percent rate of growth sustained over 1955–1974. The figure is measured in constant 1995 dollars, based on the median economy in 1974, which had a GNP/c of $730. The growth collapse, therefore, cost the average person in this economy roughly three times their annual income. See Woolcock (2000).

[18] Especially among prominent sociologists, who seem reluctant to enter the policy domain. A notable exception is Massey and Espinosa (1997).

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6

The Complementary Roles of Human and Social Capital

Tom Schuller

Introduction

This paper discusses the relationship between human and social capital, first raised by James Coleman (1988). The paper begins with a brief account of three different forms of capital: human, social and cultural. It considers why at the conceptual level social capital is relevant to policy formation. It provides a sample of approaches to the analysis of social capital, a framework for considering its relationship to human capital and the complementarities and tensions within this relationship. It concludes with some policy implications. The tone throughout is heuristic rather than definitive; that is, it encourages questions and reflection rather than providing answers. In my view, it is this heuristic quality which is the primary, and very powerful, advantage of the concept of social capital.

The paper derives from a number of potential paradoxes:

- Individual choice has rarely been so dominant, as household consumption levels rise, product customization spreads, and public services become more consumer oriented in their ethos. The growth of human capital is part of this, as individuals develop the skills and knowledge needed to participate in a modern economy. Yet at the margins of this dominance is a recognition that individual autonomy loses its effectiveness if it is divorced from social relationships, and is threatened by lack of social cohesion.
- There is a strong policy consensus, at regional, national and international levels, on the importance of lifelong learning. But following in the wake of this is an emerging awareness of the problems of focussing unduly on narrow interpretations of human capital, and on investment on the supply side.
- Demands for accountability and evaluation are stronger than ever in the public sphere, and measurement methodologies in some senses technically more sophisticated. Yet the drive toward more and more precise measurement may be self-defeating if the methodologies do

not take account of the dynamic uncertainties of the policy fields to which they are applied.

These paradoxes make a discussion of the potential contribution of social capital to policy making timely. Social capital requires attention to be paid to **the relationships which shape the realization of human capital's potential**, for the individual and collectively. These include relationships between different groups as well as within groups, so that **distributional** issues are necessarily part of the picture. But these need to be addressed within a dynamic context which captures the **interactions** between policies and institutions, and the **differing time scales** inherent in the concepts under consideration. Moreover, one effect of the success – however contested – of social capital as a concept in attracting interest in a wide range of disciplines and policy sectors has been to reintroduce **normative** issues explicitly into the debate. It shares this with the notion of sustainable development.

There is no assumption here that social capital is the magic key to successful economic or social policy. Indeed, it is as well to acknowledge that exploring the notion of social capital runs a number of risks. It is a relatively new concept, which has not yet had time to bed down. It is proving to be extremely versatile, applicable at many levels and in all kinds of policy fields – so versatile, indeed, that it may appear at times to lose coherence. It is also vulnerable to simplistic application (see e.g. Portes 1998). But the use of social capital opens up avenues of thought, conceptualization and empirical work which allow the paradoxes listed above, and many other significant policy areas, to be fruitfully addressed.

Three Capitals

The list of different types of capital is growing fast: to natural, physical and financial capitals are added organizational, intellectual, environmental and many others. Many of these overlap or duplicate each other. Some are used pragmatically, others purely metaphorically. This is not only a matter of academic theorizing, but of practical business, as competitiveness depends on the effective mobilization of assets, including intangibles. There is room for a full-scale mapping exercise of the spectrum of capitals; here, however, we concentrate on just three: human, cultural and social capital.

First, some definitions. Human capital is defined, fairly tightly, by the OECD (1998, p. 9) as "the knowledge, skills, competences and other attributes embodied in individuals that are relevant to economic activity." Duration of schooling and levels of qualification are the standard measures. The origins of human capital as a concept can be reasonably clearly traced to the work of Theodore Schultz and Gary Becker in the 1960s. It is by now highly familiar, widely used in policy thinking as well as in theoretical and empirical analysis. Although by far its most common application is to education and training, we should not forget that Becker has extended this to many other areas, such as marriage and family relations.

Cultural capital is a more academic notion, closely identified with Pierre Bourdieu (1986). It refers to the credentials and cultural assets embodied in individuals and their families. Cultural capital has been used in two contrasting directions. It is used to explain the reproduction of social hierarchy, as elite families endow their children with the cultural capital which enables them to succeed in maintaining their elite position. But it is also used to explain how some manage to use education to move from non-elite positions into elite positions.

The definition of social capital is itself problematic. It owes its prominence mainly to the work of Robert Putnam in political science (1993, 1996), James Coleman in educational sociology (1988), and Francis Fukuyama in economic history and sociology (1996), as well as to the active patronage of the World Bank (Narayan and Pritchett 1997). Its origins go back well beyond these contemporary scholars, however; clear lines of descent have been traced back to classic authors such as Adam Smith and Montesquieu (Schuller et al. 2000, Sturgess 1997, Woolcock 1998). For the majority of writers, it is defined in terms of **networks, norms** and **trust**, and the way these allow agents and institutions to be **more effective in achieving common objectives**. The most common measures of social capital look at participation in various forms of civic engagement, such as membership of voluntary associations, churches or political parties, or at levels of expressed trust in other people. More economistic interpretations give greater emphasis to the institutions and rules governing economic transactions, at micro and macro levels. Social capital has been deployed to explain a wide range of social phenomena, including general economic performance, levels of crime and disorder, immigrant employment and health trends. Despite some ambiguity, social capital is generally understood as a matter of relationships, as a property of groups rather than the property of individuals.

One simple way of summarizing the three capitals is as follows. Human capital focusses on the economic behaviour of individuals, especially on the way their accumulation of knowledge and skills enables them to increase their productivity and their earnings – and in so doing, to increase the productivity and wealth of the societies they live in. The underlying implication of a human capital perspective is that investment in knowledge and skills brings economic returns, individually and therefore collectively.

Cultural capital focusses on the way power structures are reproduced. It offers no necessary judgement on the effects of this reproduction; its function as a theory is an explanatory one. It is notable that Bourdieu makes little if any reference to human capital; and although he was one of the first theorists to use the term "social capital," his discussion of it is quite sketchy (see Baron et al. forthcoming, Bourdieu 1986). Cultural capital will not be discussed further in this paper.

Social capital focusses on networks: the relationships within and between them, and the norms which govern these relationships. Although this does not necessarily entail a specific value position on the part of those who use it as an analytic device, it has strong normative connotations, implying that trusting relationships are good for social cohesion and for economic success (Leadbeater 1999). However, strong ties can also be dysfunctional, excluding information and reducing the capacity for innovation (Granovetter 1973). There can be negative normative associations as well as positive ones – so that some networks embody the "dark side" of social capital, to the detriment of the wider society and even of its own members.

This focus on relationships underpins the relevance of social capital to the issue of social cohesion. The more positive normative approaches stress the social benefits, sometimes in a simplistic communitarian fashion. Social capital is both a consequence of and a producer of social cohesion, though not necessarily in the static sense that this might appear to imply. Putnam (2000) in particular argues that at the level of community, enterprise or nation, the quality of life – even of the better off – will be higher if membership of the community brings with it active participation. This should encourage us to build social capital directly. And where there is a dark side, this should alert us to the way networks can act against social cohesion. Analytically, therefore, social capital has a close relationship to the debate on social cohesion.

Some recent authoritative contributions to the debate have contested the validity of "social capital" because of its metaphorical character. Kenneth Arrow (2000, p. 4) argues that "the term 'capital' implies three aspects: a) extension in time, b) deliberate sacrifice in the present for human benefit, and c) alienability," and that social capital fails especially on the second dimension (he also points out that human capital fails on the third). Similarly, Robert Solow opines that the use of social capital is "an attempt to gain conviction from a bad analogy" (2000, p. 6), mainly on the grounds that it does not represent a stock of anything, and could not be measured by an accountant. On the other hand, Partha Dasgupta offers in the same volume a more nuanced position. Social capital, he argues, has its impact on the economy in precisely those areas of transaction in which markets are missing. We cannot build an aggregate measure of it, and it is, therefore, "premature to regard social capital in the same way as we do physical capital and the measurable forms of environmental capital" (2000, p. 398). However, he continues, "this is not a pessimistic conclusion.

... The concept of social capital is useful insofar as it draws our attention to those particular institutions serving economic life that might otherwise go unnoted. ... Not having an estimate of social capital is not an impediment to such exercises" (ibid.).

Such are the views of three eminent economists. The outcome of this debate within the field of economics is uncertain. Fine and Green (2000) provide a critique of social capital from a very different economic perspective, illustrating how open the conceptual and methodological discussion is. One issue is how far economists are justified in claiming authority to rule on the validity of "capital" concepts; another is the intrinsic value of the concept of social capital. My view, as stated above, is that whilst we need to retain a sharply critical perspective on its application, attempts to exclude it from the wider stock of analytical concepts are premature.

Policy Rationale: Why Bother with Social Capital?

Despite or perhaps because of its immaturity, social capital is the subject of a mushrooming number of treatments, applications and interpretations; and of a correspondingly fast-growing number of typologies and categorizations.

- In an exhaustive theoretical overview, Woolcock (1998, pp. 193–196) sorts the literature into seven substantive fields: social theory and economic development; families and youth behaviour problems; schooling and education; community life; work and organizations; democracy and governance; and general cases of collective action problems.
- An alternative broad-ranging example is the World Bank paper by Narayan (1999), *A Dimensional Approach to Measuring Social Capital*, which lists the following dimensions: structures versus norms; sources versus outcomes; form versus function; narrow versus broad; costs versus benefits; use, disuse and abuse; endowment versus constructability; and individual versus community and nation.
- Putnam (2000), one of the most influential proponents of social capital, suggests that there are three key dimensions along which social capital can be measured:

  – *vertical versus horizontal:* the extent to which networks involve relationships among agents more or less equally located in the relevant hierarchy, as opposed to relationships between agents located at different levels

  – *strong versus weak ties:* strong ties by definition create greater solidarity among network members, but these are not always functional – as Granovetter (1973) has shown, weak ties can be more effective

because they entail access to a wider and more heterogeneous set of connections
– *bridging versus bonding:* bridging ties bring together heterogeneous members, whereas bonding ties link more or less homogeneous members.

- Portes (1998), who is generally more critical of the concept, says that it is important to distinguish between the possessors of social capital, its sources and the resources involved; his own discussion, however, does not use this category set, but deals instead with "sources" and "consequences." Portes divides the former into consummatory and instrumental, and the latter into social control, family support, and benefits derived from extra-familial networks.
- Yet another perspective is supplied by Edwards and Foley (1998). They are critical of approaches that focus on social psychological attributes, and which use individual attitudinal or behavioural measures such as recorded levels of trust or personal membership of civic associations. They argue instead for approaches that concentrate on social structures and relations, and which therefore place questions of power and inequality at the centre of the analysis.

These are just five examples. There is no point in going further into what would in effect be a review of reviews. The point here is to emphasize both the scope of the concept and its apparently almost limitless versatility.

Dealing with social capital entails a number of risks. There is still no agreed definition; its measurement is problematic; and it is highly context-dependent, which causes particular difficulties when it comes to attempting to aggregate it across levels. Nevertheless, there are at least four key reasons why we should explore the potential utility of social capital as a policy concept:

1. It helps to counterbalance reliance on policy concepts and instruments which are too narrow to deal effectively with **the complexities and interrelatedness of the modern world**. The history of policy making is littered with examples of over-emphasis on single policy instruments. Technological innovation and human capital are both very powerful in their own terms, and essential features of prosperity, but they cannot be taken out of their contexts of social relationships. Social capital demands a wider focus. In this sense it is a complement to, or even underpins, other instruments of policy analysis, rather than an alternative to them; it deals with the social infrastructure which enables other policies to be effective.
2. The focus on relationships allows the issue of **social cohesion** to be addressed. Merely increasing the stock of human capital in any given society will not ensure social or economic progress. It may even

impede it by further isolating some groups, who do not have access to it, and whose position is relatively further weakened by the fact that most others are gaining skills and qualifications. Their isolation in turn may have a long-term negative impact on the benefit of human capital growth even to the skilled and qualified. Social capital brings such dynamics into the picture.

3. It helps to insert a **longer term perspective** into policy making. Social capital is not something that can be instantly or even rapidly created. Its accumulation, and its erosion, is a process that almost always requires several years at least. It therefore acts as an important counterweight to the tendency to look for quick-fix solutions.
4. Social capital reintroduces a **moral dimension** into policy thinking. The economy is not simply a machine to be engineered, tuned and repaired at a technical level without reference to its social context. The quality of relationships in any given social unit will determine its sustainability.

A number of issues remain. First, for all its deep roots, social capital is a very new arrival on the scene. Globalization means that new ideas can sweep round the world almost instantly. On the one hand, this means that the speed with which a new concept can be taken up is enormously enhanced; on the other hand, it has less time to develop organically. This opens it to risks of deformity, of inappropriate application. Secondly, social capital challenges two models or sequences which underlie the conventional linear model: investment followed by return, and analysis-action-solution. Thirdly, despite globalization, the cultural and economic contexts within which social capital exists and grows will always be very diverse. Since it is itself predominantly a characteristic of contexts, we can expect its visible character to vary correspondingly. In short, the search for an invariant and universal entity is futile. We take these issues in turn.

a. *Immaturity:* Social capital is still very much in its infancy as a policy concept, even if its intellectual lineage may be a long one. It has taken human capital over a quarter of a century to gain the purchase it currently has on policy thinking. Yet even here there are still major weaknesses, both in the availability of data and in the extent to which the data sought can be used to explain variations in economic performance or social well-being. The OECD's recent publication (1998) on *Human Capital Investment* explores these issues very capably. Moreover, the main source of power for the human capital model is the fact that it allows expenditure on learning to be classified as an investment. Yet it is very clear that the rhetoric on this is rarely matched by practice, where such expenditure is generally still reckoned as a cost. Exploration of how accounting systems, at national or corporate levels, can be adapted to give technical application to the investment metaphors, is still very much in its infancy. This has important implications for thinking about the policy relevance of social capital.

The fact that it is so youthful does not necessarily mean that we have to wait for a long time for it to mature – some great wines are ready to drink quite quickly. But it does require debate on how the concept might be most fruitfully developed. There may be an important tension here, between a natural wish to proceed immediately to applying measures of social capital to the analysis of economic and social development, and a different strategy which acknowledges that more time is needed to explore the best ways of operationalizing the concept.

b. *Non-linearity:* The investment metaphor is a powerful one, because it implies that an asset is being put to profitable use. But it is based on an essentially linear model: investment is followed by return. One of the most difficult challenges posed by the idea of social capital may be that it does not fit the linear model, at least at some levels. It is hard enough to trace the lines of causality between human capital and socio-economic performance. At this stage, it is unlikely that policy makers will be able to identify returns to social capital in any direct fashion, so the investment–return model is only partially applicable. Secondly, social capital deals with complex and diffuse areas. Values and relationships are not easily measurable, nor are changes in them easily benchmarked and monitored. The breadth of its focus is a disadvantage from the point of view of the convenience of policy analysis. But in a "risk society" we need to develop new approaches to the management of information, and social capital requires us to think in more flexible and multidimensional ways. The challenge is to match these with suitable standards of rigour and appropriate empirical evidence.

c. *Non-uniformity:* It is already clear that no single operational notion of social capital exists. Here there is some significant difference between human and social capital. The measures used in relation to human capital can be – or at least have been – applied to different levels and contexts with relatively little variance. In other words, it is possible to measure skill or qualification levels of national populations, or of workforces within particular enterprises or sectors, or of populations outside the workforce. It is, therefore, possible to aggregate these up, so that measures of the sub-units of the population can be added together without much confusion.

The case of social capital looks very different. Social capital at a local or community level may take very different forms from social capital when applied at a more macro level. Moreover, the social context will shape strongly the character of social capital, so that it will have different meanings in different cultural settings. This may appear to open social capital to the criticism that it is not a coherent concept, since it takes so many different forms. But there are two responses to this. First, the fact that a concept is context-dependent does not make it meaningless. Secondly, it may well be that by pushing us to confront the problem of consistency and aggregation, social capital raises valid similar questions in relation to human capital: how far are our measures of human capital universal, aggregable and context-independent?

Relationships Between Human and Social Capital – A Framework

One important issue is the relationships between the different forms of capital: how far are they fungible/convertible one into another, and how does growth in one impact on the others? This is a crucial issue in the debate on sustainable economic development: how can current well-being be achieved or enhanced without prejudice to the well-being of future generations, raising questions about the relationship between stocks of natural capital and other forms of capital.

Table 1 provides a framework for considering the relationships between human and social capital.

Table 1

Framework for considering the relationships between human and social capital

	Human Capital	Social Capital
Focus	Individual agent	Relationships
Measures	Duration of schooling Qualifications	Attitudes/values Membership/participation Trust levels
Outcomes	Direct: income, productivity Indirect: health, civic activity	Social cohesion Economic achievement More social capital
Model	Linear	Interactive/circular

Focus: The key distinction between human and social capital is that the former focusses on individual agents, and the latter on relationships between them and the networks they form. In an economic context, the inclusion of social capital draws attention to the obvious, but often underregarded fact, that individuals and their human capital are not discrete entities that exist separately from the rest of the organization, or from other social units. The acquisition, deployment and effectiveness of skills depend crucially on the values and behaviour patterns of the contexts within which these skills are expected to operate. Focussing on relationships rather than agents is a gestalt switch. On the other hand, it is not an alternative, but a complement, at least in a partial sense.

Input/measure: Human capital is measured primarily by levels of qualification achieved. The inadequacy of this is often acknowledged (see e.g. Behrman 1997), but the availability of large data sets allowing easy measurement ensures that it continues to dominate. Social capital is far more diffuse. It is measured broadly, and often simplistically, in terms of attitudes or values, or by levels of active participation in civic life or in other networks. The relevance of this to economic growth can be seen in a number of ways. It gives greater prominence, for example, to informal modes of learning, and the skills acquired through learning-by-doing. Network membership provides access to important information and ideas, often in a relatively unstructured way. The overlap between different spheres of activity comes into the equation. One example is the interaction between learning related to economic production and that which goes on in the domestic sphere. Another is the question of how far organizations actively encourage their staff to play a part in the life of the surrounding community – in the course of which they may well acquire skills which impact significantly on their economic performance.

Outcomes: The output of human capital is generally measured in terms of enhanced income or productivity. Social capital can be linked directly to economic performance at very different levels – at the level of nation states (e.g. Fukuyama 1996), at the regional level (e.g. Maskell et al. 1998) or between and within communities or organizations (see Grootaert 1998). It also has wider outcomes – including the generation of further social capital. Some of these – for example, the maintenance of social cohesion – in turn contribute indirectly to enhanced economic performance. Looked at from a social capital perspective, the direct impact of training may be as much in the strengthening of networks and information flows as in the acquisition of individual competencies or improving productivity.

Models: Human capital suggests a direct linear model: investment is made, in time or money, and economic returns follow. This has considerable appeal, both for its methodological manageability, and in terms of political acceptability. That is, it enables analysts to deploy existing tools to estimate the returns to investment, and politicians to justify expenditure on human capital formation. Social capital has a much less linear approach, and its returns are less easily definable. On the one hand, this incurs the charge of circularity, and it makes it harder to specify what kinds of return might be expected, and by when. On the other hand, as I argue below, such complexity is arguably a closer approximation to the real world.

The Relationship Explored

This framework generates a wide range of interesting and salient questions to do with the interaction between human and social capital. These include questions to do with trade-offs or even conflicts between the two, as well as complementarities, for example:

- To what extent do high levels of social capital encourage high levels of human capital, or substitute for them?
- Do low levels of social capital inhibit the accumulation of human capital?
- Conversely, do high levels of human capital encourage or undermine social capital?

The Impact of Aspirations and Values

Field and Spence (2000) show that in Northern Ireland the values of tight-knit communities can serve to inhibit the learning aspirations of adults, binding them into a low-skill local economy and reinforcing the divide between those who achieve high qualifications in the initial educational phase and those who do not. On the other hand, where there is low trust and poor communication between employers and the local labour force, an exclusive policy focus on increasing skills and qualifications will do little to reverse spirals of decline or attack social exclusion. Employers need to value and reward human capital in ways that communicate this to society as a whole, and not only to the most readily employable. In other words, a social capital-based analysis of local or regional conditions may reveal the weakness of supply-focussed policies and point to the need for wider, more integrated and multilevelled policy action (Maskell et al. 1998).

Skills and Competences

Communication and teamwork skills are two of the most universally acknowledged competences for a modern economy (see e.g. Levy and Murnane 1999). These can be interpreted at a basic practical level, where productive efficiency requires good communication between workgroup members. But the same message applies at other levels, where a professional community depends for its health on trust and openness of information sharing, whether this is explicit or remains tacit. Both traditional and emerging sectors of the economy provide examples of this – from diamond traders to biotechnology. It is worth remembering that although new technologies are often associated with rises in productivity, the nature of the relationship remains unclear; it is certainly not the case that technological change can be assumed to fit smoothly with rising levels of skills. Human capital can certainly be understood to encompass social as well as technical skills; but social capital brings to the fore the social networks and values through which skill portfolios generally are built, deployed and rewarded.

Employment Relationships

> Paradoxically, just as one would think that firms would be building closer relationships with their key knowledge workers to keep them committed to the firm, they are smashing that implicit contract also. ... Firms invest less in on-the-job skill acquisition for these knowledge workers, even when they want them to stay around, since they know that fewer of them will stay around.
>
> (Thurow 1999, p. 143)

Thurow points to changing employment relationships, notably the putative decline of lifetime employment, and how these affect investment in human capital. But what is the answer to this? It is in all probability futile to appeal to employers to support more secure employment contracts. The answer is twofold. First, a clear role for peer-promoted values, so that professional bodies, or regional chambers of commerce, or other agencies, support the development of human capital through normative pressure. Secondly, more transparency and honesty rather than loyalty as the basis for employment relationships, so that there is a clear understanding between employer and employee on the investments being made (see McRae 2000).

Units of Analysis – Family and Demographic Dimensions

Intra and intergenerational relations are less likely to be neglected in a social capital framework than in a policy framework which focusses only on the skills and qualifications of a population at a given point in time. This issue can be exemplified by reference to the patterns of working time, at individual and household levels. Using training programs to bring more lone parents into the workforce or create more dual-earner households may reduce unemployment, increase output and raise gross household earnings in the short term. But the divide between work-rich/time-poor households and those with low or no employment incomes is sharpening; and the impact on family ties, and especially on children's social upbringing, may outweigh these immediate gains, both for the families concerned and for the wider society. Putnam (2000), for one, identifies the growth in dual-earner households as a factor in the decline of social capital, though he rejects the implication of a return to traditional patterns of employment. This illustrates the tensions between different policy objectives. A social capital analysis is more likely to capture such tensions.

However, it is not only a matter of trade-offs between human and social capital. In the context of an aging population, more thought needs to be given to how the skills and know-how of older people can be sustained and indeed developed. This may be through policies designed to enable them to remain longer in the active labour force; for example, in part-time employment where they combine conventional paid employment with pension payments to make up a decent income. But it can also be through enabling them to deploy their skills in voluntary work. Older people have a major role to play in maintaining levels of civic engagement (see e.g. Laslett 1989), in ways which exhibit a positive-sum complementarity between human and social capital.

In short, direct substitutability between different forms of capital is only one of the policy dimensions that requires consideration. The interactions between different capitals generate a myriad of different policy issues, with implications for how such interactions are to be measured. The complexity is increased when we try to reconcile micro- and macro-level considerations, once we discard the assumption that a macro picture can be built up simply by aggregating micro-level information.

The argument can be extended to the links between sustainable economic growth and social capital. Sustainability resembles social capital in being multifaceted, and in the way in which it can be brought into play in a number of different policy contexts. It is also a classic case of a "contestable concept" with significant debates occurring over its substantive meaning and ideological significance. One key aspect is the broadening of sustainable growth to include social and economic as well as environmental factors. It also resembles social capital in the way that relationships and interdependence are central to it, and the challenges it, therefore, presents for a broader and more dynamic approach to policy making.

One final point needs to be made, concerning the relationship between competition and collaboration. Sustainable development is closely associated with the notion of global interdependence, as human capital is with economic competitiveness. Social capital can appear as a rather cosy attempt to defuse the tensions of competition, but in its more sophisticated forms it addresses the interaction between economic openness and social change on the one hand, and the maintenance of trust and stability on the other (Leadbeater 1999). Both sustainable development and social capital address the dynamics of growth and change, seeking to place these in temporal context which unites the long and the short term.

Measuring Social Capital – Some General Propositions

Social capital may be a prime illustration of the **importance/measurability** dilemma: the important may not be measurable but this does not stop the measurable from becoming important. However, this is a paradox of despair. In almost any sphere, the question is not the binary one of whether or not something is measurable, but to what extent (as well as under what conditions and at what cost). In other words, we should concentrate on the extent to which parts of the jigsaw can be filled in without sacrificing the overall picture, or succession of pictures.

Related to this is the issue of **appropriate technomethodology** (Schuller 2000). Already, there are signs of statistical techniques being applied in ways that are poorly matched to the quality and the robustness of the data. This is particularly true where the data consist of comparative attitudinal surveys (e.g. on declared levels of trust), using highly ambiguous terminology. Quantitative analyses which relate these, and through them levels of social capital, to general measures of economic performance, need very severe health warnings. More positively, the debate over which methodologies are appropriate is potentially a very challenging and fruitful one.

There are some curious possibilities relating to the **impact of measurement**. In the natural sciences, the impact of the observer on the observed is taken for granted. Social capital may be an extreme example of this in the social field. For where trust becomes the focus of attention, this may cause it to wither as much as to flourish; some relationships, norms and networks are strongest when they are not exposed to constant examination. On the other hand, it has been well argued that if we are moving toward risk societies, and proactively managing risk rather than passively coping with it, so we should be moving from the passive valuing of trust to its active maintenance.

The **problems of aggregation** may set social capital in a class of its own for measurement purposes. Grootaert (1998) lists as one of the desirable properties of indicators, being subject to aggregation – from household to community to nation. Can this be meaningfully done for social capital, or are we faced with a qualitative shift in the meaning of the term at different levels? If the latter, this may imply such centrifugality that meaningful measurement is ruled out. On the other hand, it may result in a useful challenge to the unrealistic separation of levels, and especially the simplistic binary division between micro and macro.

Finally, there is a major issue surrounding the need to capture the **dynamics** of social capital. This has at least two dimensions. The first is a conventional measurement issue, of complementing cross-sectional analysis with longitudinal so that changes over time can be analysed. The second is more qualitative. The accumulation of social capital is not something that can be evaluated in simple linear terms: the more the better. Networks may become denser (with higher social capital), and in doing so undergo qualitative change with negative consequences, where they lose openness and so become dysfunctional. High levels of social capital may be accompanied by stasis. Capturing the **trajectories** of social capital is a major task.

On all of these issues, however, we should remember that the complexities and difficulties do not apply to social capital alone. Although it is well established as a central policy concept, the notion of human capital could very well be scrutinized under just these headings. For example, while measures of human capital appear to allow simple aggregation (i.e. from the levels of qualification in different sub-communities to the population as a whole), this can lead to flawed and simplistic assumptions about the relationship between the total stock of human capital and economic performance (OECD 1998).

Some Policy Implications

The discussion above has been schematic and condensed. It points implicitly to a large range of substantive policy areas and methodological issues. Here in conclusion are just five areas that illustrate the breadth of the agenda.

Worktime Patterns

The polarization of employment is one of the great threats to social cohesion. The contrast between work-rich and work-poor households has developed alarmingly over the last two decades. One of the seminal findings of Coleman's work (Coleman 1988) was the way in which families with high human capital and high net earnings may nevertheless be low in social capital because there is little time for social interaction within the family and between the family and other social institutions. This is also a major conclusion of Putnam's recent work (2000). These findings place the issue of the distribution of working time at the heart of the policy agenda.

Linking Technology to Social Development

New information and communication technologies (ICTs) have created enormous opportunities for access to knowledge, and for new ways of working and learning. A huge range of networks becomes possible. At the same time, they pose threats to the ways in which knowledge is accumulated and shared. As with worktime, there are strong trends toward polarization; at every level, there are groups at risk of social exclusion. There is a whole series of questions to be asked about how ICTs can be geared to enhancing social cohesion, for example, in its use within educational systems, or in the way it may be used to enhance community capacities at local level.

Informal Learning

Human capital is not built within formal educational institutions and frameworks alone, or even predominantly. Even more obviously, social capital depends on people being able to participate actively in the relevant spheres of social life. Occupational skills are learned on the job, implicitly as well as consciously. Values as well as competences are only truly learned when they are applied. There is no necessary logic to the sequence "first learn then do." This simple observation has enormous implications for policy, nationally and at corporate and community levels. In particular, it raises major questions about the extension of the initial phase of education, where young people spend on average more and more time in formal education. We have to ask not only whether this is the most effective distribution of educational opportunity, but what the impact is on their subsequent capacity and motivation to learn. The relationships between formal learning and wider learning through participation in economic and social life, at all different stages throughout the life cycle, need serious re-examination.

Time Scales – Evaluation and Intergenerational Solidarity

One of the major challenges posed by the sustainable growth agenda is that of the time horizons implied in it. Stasis is not an option. On the other hand, the sheer unpredictability generated by the pace of change destabilizes conventional policy frameworks. One of the most important aspects of this is the way in which relationships between generations are conceived of and managed. In both environmental and welfare spheres, the costs and benefits of one generation's activities impinge heavily on those of its successors (and to a more limited extent its predecessors). Even making such issues explicit runs risks, for example, of increased intergenerational conflict over public expenditure, but the risks are unavoidable. If social cohesion is to be maintained and improved, we need more sophisticated and flexible instruments for assessing and evaluating the implications of our actions, and these instruments will have to accommodate widely differing time scales.

Joining Up Policy

Improved coordination is one of OECD's favourite policy recommendations. Sometimes this begs the question of who is to do the coordinating, with an implication of top-down, and perhaps unrealistically mechanistic approaches to policy implementation. A social capital perspective opens up wider alternatives. Its focus on horizontal as well as vertical relationships, and on the sharing of information and values, suggests a different form of coordination, developed through the ongoing interaction between stakeholders. It allows for friction, even conflict, but proposes, in overt normative fashion, that there should be high levels of mutual understanding in order for these to be resolved. This, probably, is why it can be characterized as a blend of socialism and liberalism.

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Commentary

Jo Ritzen

Allow me to first compliment the organizers of this symposium. I have seen very few which were so well prepared. Also compliments for the choice of the topic. In the past decade, Tom Alexander and I have been involved in many informal meetings of OECD ministers of education. One of the main topics in these meetings was the intangible, the unseen, the mysterious which was viewed by ministers as probably the most important. More important possibly than physical capital or natural resources, equally or more important than human capital was this fluid spirit of social cohesion or social capital. I will use both terms as synonyms for the time being and come back to the distinction later.

The keynote address and the three papers presented in this session are important contributions to the topic. They provide part of the variety of issues involved. I will comment on them one by one, trying to focus on what we have learned in the past decade, but also where major questions still are unanswered. In general, in human capital, progress has been slow, indicating maybe decreasing marginal products. Running out of steam, the major step ahead in human capital seems to be to shift from crude output measures, like years of education, to more refined measures, like achievement. In contrast to human capital, progress in social cohesion has been fast. Here the major challenge is to bring the research into the policy domain. Particularly, the question of how to influence social cohesion by means of individual or collective action is to be addressed more forcefully. Mike Woolcock challenges us to think about six directions. I noted that he did not mention education.

Bob Barro's keynote address is an excellent example of where we are. He highlights the importance of refined measures of human capital. His paper is also an illumination of the general point that the proceeds from all kinds of capital, whether natural resources, land, physical capital or human capital, are enhanced through social capital/social cohesion, as proxied in his paper by the rule of law.

Two points of comment:

1. There is one major omission in his paper, as, I believe, also in his 1997 book and this pertains to two characteristics of the public sector. The first characteristic is that the public sector is accounted for in Gross Domestic Product (GDP) not by its contribution, but by its wages. These wages are set by public choice rather arbitrarily and do not need to reflect marginal productivity in the short run. OECD countries show a huge variation in the ratio of public-sector wages to private-sector wages, which can be explained only by short-run erratic deviations from marginal productivity.

   A second characteristic is that the public sector is the most human capital-intensive sector of a country. This is definitely the case where education is public. The education sector is – with the medical sector – the most human capital-intensive sector.

   These two characteristics of the public sector play a greater role the larger the public sector is and much less so in the US, where the public sector traditionally is smaller than in the EU. I would recommend to redoing the analysis of Bob Barro taking the public sector out.
2. I like Barro's expansion into the domain of achievement tests. At the same time, he may be measuring something different. He finds that the science test scores are the major contributor to growth. This result, however, appears quite different on second look. The science test scores differ substantially between the Asian countries and the Western countries. At the same time, growth rates also differ substantially. So I would suggest that "science scores" is more a dummy for the Asian Miracle.

   I would not have said this if the Western outliers had behaved according to the Asian pattern. These outliers are the Netherlands and Sweden. There the science scores are higher and almost on "Asian" levels. Yet growth was more on the Western level.

Gunnar Eliasson's paper is one of his contributions to the role of knowledge in growth. It underlines the importance of the social framework for reaping the benefits from human capital. Here, the social framework should be conducive to having new firms easily entering and exiting. Some social frameworks allow this more than others. Bankruptcy, for example, is not accepted socially in many countries. This decreases the potential for entry if the penalty for not succeeding is being a social outcast, or worse – as one sees in post-crisis Indonesia – when firms which are bankrupt do not go bankrupt, breaking down the financial system. Another suggestion to him would be to treat codified knowledge on the same footing as tacit knowledge.

Mike Woolcock has become in the past two years a major force in the resurgence of research on social capital. I find his paper very convincing indeed. Especially, the point he made in discussion about using public space more effectively in order to grow social capital appeals to me. (I thought this was a personal preference but now I have a logic to support it.) On one point it appears that he is too abrupt (i.e. on the distinction between sources and consequences of social capital). There is a bridge between the two notions. Not all networks relations, norms, etc. (sources) contribute to social capital. It might be useful to limit the definition of social capital to those networks relations and norms, etc., which potentially can contribute to ... yes, and then what? There we need the debate. I would forward that social capital should contribute to decisions in societies which have a net benefit in the longer run with short-run costs (outweighed by the benefits) through the ability to cooperate. This is presumably Schuller's view: social capital as an enabler.

Tom Schuller's paper presents a good overview. I wish to comment on two of his points.

1. He introduces the notion of a moral dimension implied in social cohesion or social capital. This is certainly the case if governments actively promote norms and values. But how do we reconcile this with the freedom of the individual to set – within the Constitution and the law – those values and norms himself? This is not just an academic question. It has been a broad political debate in many EU countries.
2. Tom challenges us to rethink the length of the time period of formal education from the point of view that social capital is acquired outside formal schooling and that social capital **counts**. For me this conclusion is much too rashly taken. Lengthening formal education may indeed have contributed less to equality of opportunity than previously thought. But it remains an important contributing factor.

All these comments are of the nature: debate now and more research later is needed. Let me underline again that I made the comments with admiration for the four presentations.

T.J. Alexander

This symposium provides an excellent opportunity for the OECD to take forward its own discussion on human and social capital, particularly in the framework of the current work on the "Growth Study" which Thorvald Moe described earlier in the conference. The OECD's main, but not only, clients are the governments which make up its membership. As I see it, the OECD has three fundamental roles to play. It has to inform the process of public policy making; bring new issues to the attention of governments; and add to the stock of knowledge in many areas in which it is involved. This symposium will serve to address all three aims, but most importantly from the, perhaps narrow, standpoint of the OECD, the policy perspective. Hopefully, our discussions will enable us to come to an understanding on the concept of social capital that will respond to policy-making needs and measurement issues. The key question is can we reach a consensus on how to define and observe the phenomenon of social capital in ways that clarify the issues, identify policy options and evaluate progress? To help us in that quest there are four excellent papers and presentations by Robert Barro, Gunnar Eliasson, Michael Woolcock and Tom Schuller.

Clearly, the very intimate relationship between social and human capital and their circularity – the continuous process of mutual reinforcement between these two capitals – means that there are messages from the way in which human capital theory has developed that are relevant for social capital. I will return to the question of human capital later.

In terms of definitions of social capital, we are confronted with a myriad, but both Woolcock and Schuller have in their papers refined the various concepts. As many have pointed out, the underlying idea has existed in many forms for considerable time, but what is new is the growing interest that the concept is receiving outside the realm of the sociologists, especially from the economists. Michael Woolcock has eloquently brought together the various concepts in his paper to argue for a definition which states that "social capital refers to the norms and networks that facilitate collective action." In his terms, the focus should lie on the sources of social capital rather than its consequences. Woolcock also argues that the value of social capital is in its capacity to facilitate dialogue and cooperation between different disciplines and sectors of policy making.

For Tom Schuller, it is the heuristic quality of the concept of social capital that is its primary advantage. He views the potential utility of the social capital concept as its ability to provide a framework for addressing a series of other policy areas. But what Schuller describes as the "almost limitless versatility" of the concept, though intellectually interesting, brings with it risks of diffusion and imprecision. He, like others, also draws close links between social capital and the debate on social cohesion – a discussion taken further by Jo Ritzen in his paper in session 4. For both Woolcock and Schuller social capital resides in relationships, in contrast to human capital which resides in individuals.

The "mean and lean" definition by Woolcock is persuasive and provides a good starting point for observing the phenomenon of social capital. I was, however, much less convinced by his identification of the policy issues. It is in terms of policy relevance that more reflection will be needed to identify where public policy can impact upon the creation and accumulation of social capital.

It is probably worth recalling here that the term "human capital" is relatively new, entering the lexicon some four decades ago. Despite the wealth of literature, it has to be recognized that the term is less than clear-cut. It can be defined in a number of ways and according to a number of perspectives.

For its part, the OECD, in a report to Ministers in 1998 on human capital, focussed on the "knowledge, skills, competences and other attributes embodied in individuals that are relevant to economic activity" (de la Fuente and Domenech 2000, p. 9). This approach was a response to the policy interests of Education and Employment Ministers as well as Economic and Finance Ministers concerned about the need to examine the linkages between education, training and adult learning in improving economic performance.

It is true that growth, employment and productivity are not the only benefits we can measure, or speak of, in the definition of human capital. There are many other types of benefits that flow from investment in education and learning, such as improved health status, social cohesion, etc., that have potentially important feedback into productivity and economic growth.

The OECD report also identified some of the difficulties over the measurement of human capital and the gaps in the potential data set. None of us would claim to be satisfied with the measurement of human capital, and there is wide agreement on the need to find ways to reflect the quality of learning outcomes. The use of levels of educational attainment as proxies for capturing the quality of human capital is less than satisfactory. The important paper by Robert Barro raises a series of issues related to data. It also raises a number of problems in the approach that has been taken – at least from the point of view of OECD policy makers. A strong plea is made in the paper for using a wide cross-section of countries on the grounds that more variability can be picked up for different variables while holding income constant. This assumes a uniform underlying structure and relationship over all countries. But for an OECD policy maker – while not underestimating the interest in looking at developing countries to understand the wide variation in underlying values like political stability, income level, basic education, etc. – if the data for OECD countries or the wider set of "rich countries" show no significant impact over a 20-year period, it is difficult to avoid drawing conclusions on future policy options, given that most industrial societies have attained relatively high levels of literacy, income and institutional stability. What would be helpful would be more refined analysis within "OECD-type" countries to shed more light on which types or qualities of human capital investment, as well as other "policy instruments," are effective in boosting long-term growth.

I would draw attention to the paper by de la Fuente and Domenech, which gives grounds for thinking that there is an underlying problem of quality of data used in the Barro paper. Contrary to the Barro analysis, the improved estimates of attainment in the adult population in the de la Fuente and Domenech paper suggest that initial education does have a significant positive impact in OECD countries.

New developments in capturing the quality of education probably provide the most promising directions for future research. For example, the International Adult Literacy Survey (IALS) which will shortly be reporting data for 20 countries (10 of them reporting in the mid-1990s and the rest in 1998), may provide useful benchmarks for the quality of human capital in the adult population. We have already seen from the data already published that educational attainment defined in years of schooling or level of initial qualifications may not be an effective predictor of human capital. An early finding of this survey was that literacy is dynamic and could easily become obsolescent if not constantly challenged and developed.

Equally important is the emphasis that has been placed on broadening the concept of human capital to include skills and competences acquired outside formal learning settings as well as across curricular domains – Cross Curricular Competencies (CCC) – in schools. In particular, the OECD has been conscious from the early days of its education indicator work of a major lacuna in the indicator set. The Programme for International Student Assessment (PISA) is a major response to that gap. The first cycle of PISA will run across all OECD countries and some developing countries during the course of 2000, testing 15-year-olds in reading literacy as the principal theme, with mathematics and science as minor themes. The second and third cycles in 2003 and 2006 will address the other two themes in turn as the major domains of the programme. PISA will provide assessments of key competences that go beyond the confines of the curriculum and will yield a new set of policy-oriented indicators that will help monitor the knowledge and skills of 15-year-old pupils. This new set of international test data, together with the literacy data becoming available, will offer greater insights into questions about the quality of learning.

With a rather longer time frame, the OECD has also launched an international effort under the leadership of the Swiss to establish a theoretical framework for the definition and selection of competences (DeSeCo). This will support further work in PISA as well as provide the scientific underpinning for possible future developments on a new survey of adult competence.

Gunnar Eliasson drew our attention in his paper to the need to look at another area where measurement capacities are limited and where the issues might be even more – the intermediate levels between individuals, society and the economy. Somewhere "in between" in the black box of companies, organizations and other entities, complex competence (his competence bloc) is harnessed, rewarded, organized and integrated into collective practices and relationships. Gunnar Eliasson has provided important insights into managing these competence blocs.

I should now like to return to my opening proposition on the relevance of the concepts of human and social capital for public policy making. It is debatable just how meaningful for policy makers the distinction between human and social capital is. Indeed, much of the contribution to this symposium dwells on the intimate and mutually reinforcing relationship between social and human capital. I would argue that an equally valid conceptual framework for analysis would be to take the idea of the "learning society" as the conceptual framework and to view norms, networks and engagement as growing out of that learning society, where education and learning are but one input. The idea that human capital begets social capital begets human capital and so on, strengthens the arguments in favour of lifelong learning. I confess to some surprise that lifelong learning has attracted so little attention in the documentation for this symposium. Tom Schuller is right when he says that lifelong learning raises issues for initial education. It raises issues for a wide range of policies in ways that are not yet entirely understood. For example, if lifelong learning were to be perceived as a reality, we would be able to adjust the very heavily front-loaded curriculum of initial education and focus on some of the problems of motivation in school that Schuller raises.

If we were to focus on the contribution that public policy can make to investment in the acquisition of human capital throughout the life cycle through early childhood, compulsory and tertiary education, adult learning, research and the promotion of learning-on-the-job, we could strengthen the bonds of civil society, reap the benefits of social capital and contribute to sustained economic and social progress and inclusive societies.

Reference

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Part 3

Considering the Empirical Evidence for the Economic Impact and the Broad Social Returns to Human and Social Capital

7

Social Capital – Measurement and Consequences

Robert Putnam

This paper starts with a discussion of definitions of social capital, then turns to issues in measurement, and finally, presents some evidence on the consequences of social capital. In the last five years, I have been working exclusively on some specific and perhaps unique problems about social capital in the US, so all of my examples are going to be drawn from the US experience. I do not want to be interpreted as saying these trends are common to all OECD countries. It is just that the US has been the main focus of my research for the past five years.

There are, among those of us who work in the area, some marginal differences in terms of exactly how we would define social capital, but Michael Woolcock correctly says in his paper that among the people who are working in this field, there has been a visible convergence, definitionally, toward something like the definition he offers. The central idea of social capital, in my view, is that networks and the associated norms of reciprocity have value. They have value for the people who are in them, and they have, at least in some instances, demonstrable externalities, so that there are both public and private faces of social capital. I am focussing largely on the external returns, the public returns to social capital, but I think that is not at all inconsistent with the idea that there are also private returns. The same is no doubt true in the area of human capital (i.e. there are simultaneously public and private returns).

In the great debate of the two Cambridges about "capital," the focus of much of the discussion was on whether physical capital was homogeneous enough to be susceptible to aggregate measurement. There is room for similar debates about human and social capital. Obviously, there are many different forms of physical capital. For instance, both an eggbeater and an aircraft carrier enter into the American national accounts as little bits of physical capital, and yet they are not interchangeable. Try fixing your morning omelette with an aircraft carrier, or try attacking the enemy with an eggbeater. The same thing is true about social capital. Social capital is certainly far from homogeneous.

There are some forms of social capital that are good for some things and not for others. Now, it is not so easy to see yet exactly how we should add up all those forms in the same way that, I gather, it was initially not easy to see how we were going to add up all those different forms of physical capital. Accepting that there is no single form of social capital, we need to think about the multiple dimensions of social capital. High on the research priority list in the area of social capital, as far as I am concerned, is developing the theoretically coherent and empirically valid typologies or dimensions along which social capital should vary. I will give some examples of how social capital varies, but I do not think we are anywhere near yet a kind of canonical account of the dimensions of social capital.

Some forms of social capital are highly formal, like a PTA (Parent-Teacher Association) organization or a national organization of any sort, or a labour union, formally organized with a chairperson and a president, and membership dues and so on. Some forms of social capital, like the group of people who gather at the bar every Thursday evening, are highly informal. And yet, both of those constitute networks in which there can easily develop reciprocity, and in which there can be gains. Some forms of social capital are densely interlaced, like a group of steelworkers who work together every day at the factory, go to Catholic church every Sunday, and go out bowling on Saturday. That is a very dense, interconnected, multiplex form of social capital. There are also very thin, almost invisible forms of social capital, meaning networks and the associated norms of reciprocity, like the nodding acquaintance you have with the person you occasionally see at the supermarket, while waiting in line.

Do not be too dismissive of very casual forms of social connection, because there has been good experimental evidence that if you nod to people in the hall, they are more likely to come to your aid if you should have a fit or have a heart attack, than if you do not nod to them, even if you do not otherwise know them. Merely nodding to someone in the hall generates visible, measurable forms of reciprocity. So there are, as I say, these very evanescent forms and also quite regular forms of social capital, both formal and informal. I agree with Michael Woolcock that one of the most important distinctions is between bridging and bonding. And I certainly agree with him that not all social capital has good consequences for everyone.

This was called most vividly to my attention in a book review that appeared on the front page of *The New York Times* several years ago, written by a former student of mine. He was not reviewing a book of mine, but somebody else's. In his review, he called attention to the fact that Tim McVeigh cooked up the Oklahoma City bombing in a bowling alley in Oklahoma City. The reviewer then juxtaposed this with my article written several years ago, called "Bowling Alone" (Putnam

1995), in which I called attention to the fact that Americans were no longer bowling in leagues. The last line of *The New York Times* review is "we all would have been better off if Tim McVeigh had gone bowling alone." The network of people who formed this conspiracy was indeed social capital – it enabled Tim McVeigh to do things he could not otherwise have done. However, this was clearly an example of social capital (involving as it did, both reciprocity and trust) that was put to genuinely destructive ends. In short, it had negative externalities. Of course, this possibility is not unique to social capital. In that same bombing, there were bits of physical capital that were put to destructive ends, the truck that was blown up, and there were bits of human capital that were put to destructive ends, the bomb-making expertise. What I wish to emphasize is that all forms of social capital, indeed any form of capital, can be used to ends that are in some instances destructive.

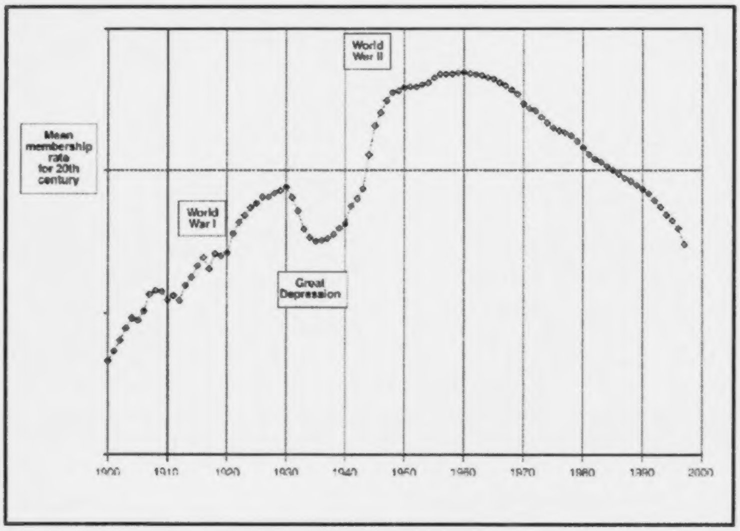
I now turn to address issues of measurement, especially measurement of long-run trends, over the course of the 20th century, in social capital in the US. For many Americans that is an interesting question. In Putnam (1995), I conjectured that the long-run trends, at least the recent trends, in social capital in the US were down. In that article I provided preliminary evidence that showed, at least by some measures, that membership in organizations was down. My recent book (Putnam 2000) looks in much more detail at the question of trends in social capital in the US. In the course of doing research for that book, I faced the same problem that students of global warming face. That is, you know exactly what evidence you would have liked people to have collected 200 years ago so that you could now tell whether there have been subsequent trends in warming, but you are stuck with what data happened to have been gathered then. The solution that the global warming people use is to triangulate among different sources of evidence, any one of which is imperfect. However, if you get the same basic story from ice cores in Greenland, from tree rings in the southwest of the US, and from the temperature records of the British Admiralty, even though any of those measures is subject to some error and none of them is exactly the measure you would want, concordance among different sources of evidence makes more plausible the claim that there has been an upturn in average global temperature.

I want to show you very briefly the kinds of evidence that I have brought to bear on the question of long-run trends in the US in social capital, and I want to begin with the simplest kind of evidence that I used in my earlier article. I now show this evidence by means of market share measures for many major civic organizations in American life. What fraction of all Jewish women in America belongs to Hadassah? What fraction of Catholic men belongs to the Knights of Columbus? What fraction of all adult men belongs to one of the "animal clubs," that is, men's organizations? (Animal clubs is a technical term. I only realized when I began doing this research that all men's clubs in America are named for animals: the Lions club, the Moose club, the Elks club, the Eagles club, and so on.)

So for all these organizations we gathered market share data, as well as for many other organizations. What fraction of rural kids belongs to the 4-H? What fraction of girls belongs to the Girl Scouts? What fraction of parents belongs to a PTA? And so on. We have done it for more than 30 large organizations. Virtually all of the individual graphs look like Figure 1, which in fact shows the average membership rates for 32 national chapter-based voluntary associations for almost the entire 20th century. By the way, an almost identical graph applies to professional organizations. If you ask what fraction of all doctors belongs to the AMA (American Medical Association), what fraction of all electronic engineers belongs to the IEEE (Institute of Electrical and Electronic Engineers) – market shares is what I am talking about here – those graphs also look like Figure 1, that is, rising for the first two thirds of the century with a sharp dip during the Great Depression – many organizations lost half their membership between 1930 and 1935 – followed by a long period of very rapid growth, doubling on average in market share. The growth in membership numbers was even greater, because the total population was growing.

Figure 1

Average membership rate in 32 national chapter-based voluntary associations, 1900–1997



Probably that period between 1940 and 1965 was the most rapid period of civic revival in American history. Figure 1 does not prove that, but I believe it was the case. And then suddenly, silently, mysteriously, inexplicably, all of those organizations began to experience levelling market shares and then decline in market shares, and gradually the decline in market shares became so great that they began to experience absolute decline in the number of members. By 1997, in terms of market shares, the average organization was back to Depression levels. Not all organizations' membership fell at the same time. The AMA actually was the first to peak in terms of its market share. Appropriately, the last of my organizations to peak and begin to fall was the Optimists. The Optimists did not begin falling until 1980, but then they really plummeted and so they are now back down in terms of their market share below what they were in the 1930s.

But there are two reasons to doubt the adequacy of the membership data as a sufficient measure of social connectedness. First of all, it is based on membership in fixed organizations. I wanted to know membership across the whole of the century, so I needed some measures that would last across the whole century. But there might have been another shadow universe of organizations that was growing while these were declining, so perhaps this graph represents just changes in the pecking order of organizations, and not a universal pattern.

Secondly - and I want to underline this because there has been some misunderstanding of my own position on this, among other places in Steve Knack's paper - I do not believe, nor have I ever believed, that associations were some privileged form of social capital, except in the sense that associations tend to gather data on themselves and, therefore, it is easier to gather data on associations. Beyond this greater ease of measurement, there is nothing canonically superior about formal associations as forms of social networks.

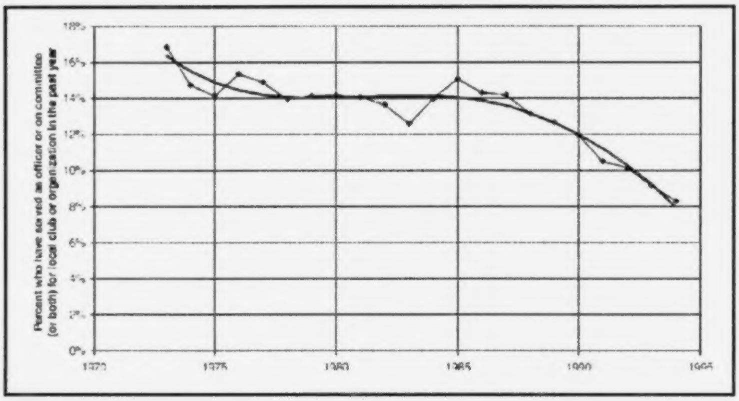
Of course, it could be true that associations were becoming less common in America but that we were hanging out in bars more, that we were having more picnics, that we were seeing folks at our home at night more often, and those forms of informal social capital can be quite important. But I could not figure out where the picnic register in American society was located. Where would I go to find out about trends in picnics over time?

Both of these possible shortcomings of the membership data were solved when I discovered two massive new archives of data in the US. These are infinitely interesting datasets.

One of them, the Roper survey, has asked national samples of Americans, every month over the last 25 years and continuing still, questions of the following form: In the course of the last year, did you do any of the following things? Did you sign a petition, write a letter to your congressman, attend a local meeting, serve as an official of a local club, serve on a committee of any local organization, work for a political party? By political science standards, the Roper database is a huge one, with more than 400,000 surveys, and it shows unequivocally a decline in all these forms of civic participation. Figure 2, which happens to be the graph of the Roper data for the percentage of Americans who had, in the course of the last year, served either as an officer of a local organization, or as a committee member of a local organization - any organization, not just one of my 32 national organizations - shows a quite dramatic drop, basically a cut in half, over these years. Every one of the 12 different kinds of connectedness covered in the survey shows the same decline.

Figure 2

Active organizational involvement, 1973–1994



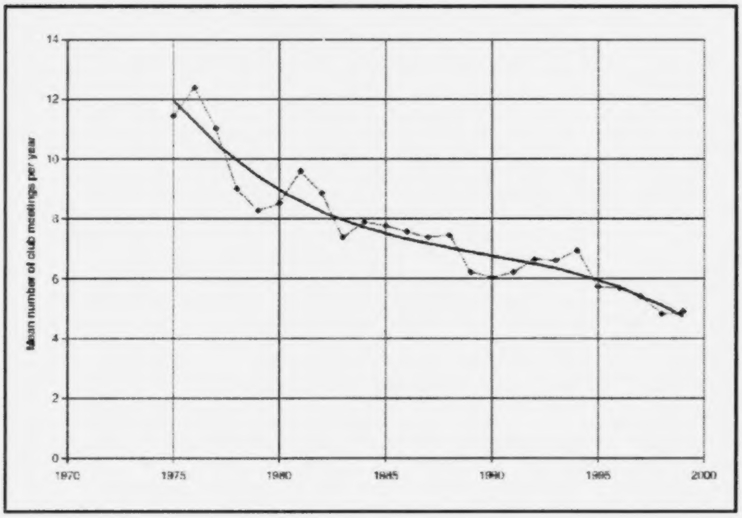
The most novel data, however, come as a by-product from systematic surveys by a commercial marketing firm in Chicago called DDB Needham. Every month over more than 25 years, the firm has surveyed very large samples of Americans, mainly on their consumer behaviour. Do you prefer Nike or Adidas? Do you prefer Yoplait or Danone yoghurt? And so on - but the firm began to have the idea 25 years ago that it would be helpful to gather information about their respondents beyond their yoghurt-eating habits. If you are trying to write an ad for yoghurt, it would be useful to have in your mind something else about these people besides the fact they eat yoghurt.

Thus, DDB began asking a broader range of questions. The questions included: How many times in the course of the last year did you go to church? Did you go to a club meeting? Did you volunteer? Did you work on a committee project? Did you have friends over to the house? Did you go on a picnic? At last I had found the picnic register! The answer, by the way, turns out to be that in 1975 the average American went out to a picnic five times per year. In 1999, the average American went on two picnics per year. Reductions of that order characterize almost every single measure of social activity in this survey: playing cards; having friends over to the house; dinner parties; having dinner with your family; going to club meetings; card games; and so on.

It gets boring after a while because all the graphs look the same. Figure 3 provides a typical example of the DDB data. In 1975, the average American went to 12 club meetings a year. Conveniently, that is once a month. By 1999, the average American went to five club meetings a year. There are many other questions. How many times in the course of the last year did you give the "finger" to other drivers; that is, made rude gestures to another driver? That actually turns out to be an interesting datum. People were also asked about their tax evasion. And among the thousands of variables in this dataset, by far the best predictor of tax evasion is the number of times in the course of the last year that you gave the "finger" to another driver. (I have a great idea for the IRS [Internal Revenue Service] auditors, and if rational expectation is right, one of two things ought to happen: either the IRS

Figure 3

Club meeting attendance dwindles, 1975-1999



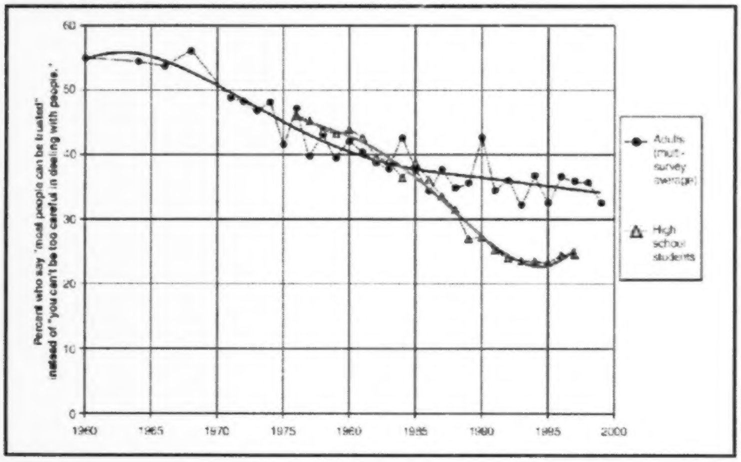
will get better at finding tax evaders, or else the apparent level of comity on American highways will improve.)

I have thus far described one set of indicators: formal membership and participation in many different forms of informal networks. I am trying to build up the evidence, both for you and for my larger American audience, for the claim that basically the same stories are being told by the ice cores in Greenland and the tree rings in Arizona.

Another form of evidence that fits perfectly with this picture comes from data on social trust. I am in agreement with Michael Woolcock that social trust is not part of the definition of social capital but it is certainly a close consequence, and therefore could be easily thought of as a proxy. Figure 4 shows what the trend is, based on many surveys asking the same question: basically, do you trust other people? The graph shows that there has been a 40-year steady decline, and a decline that is actually greater among American youth than among adults. Other analysis has shown very clearly that the decline in social trust in America is entirely generational; that is, if you look at any birth cohort, average trust has not changed over time, but each successive birth cohort over the last 30 to 40 years has become adult with a lower level of social trust.

Figure 4

Four decades of dwindling trust
Adults and teenagers, 1960–1999

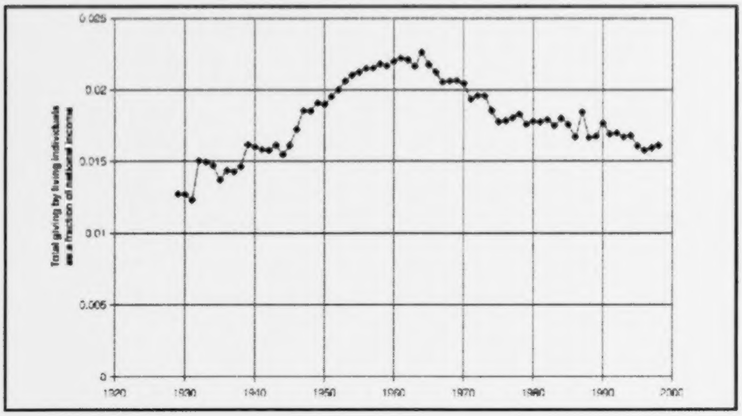


Now there are other indirect measures that one can use. A slightly less direct measure comes from data on organized altruism. Altruism (doing good for other people) is not part of the **definition** of social capital in my view, but it turns out empirically, at least in the US and probably elsewhere, that a very strong predictor of altruism is social connectedness. That is, the people who give blood, give money and have volunteered their time are people who are more connected. By far the best predictor of philanthropy, for example, is not how much money you have, but how many clubs you go to or how often you go to church. There is a very strong affinity between social connectedness and altruism. Therefore, it would be very interesting to ask about trends in philanthropy, or for that matter volunteering or blood giving over time.

The best data come from data on philanthropy over time. The metric used here is not absolute number of dollars given, because of course that rises every year, but what fraction of income of Americans is given to all forms of charity. Figure 5 shows the results. Not accidentally, it has exactly the same profile over time as do the membership data that I quoted before. It rises steadily until 1964 – the 1930s jump by the way is a change in the denominator, not the numerator. Even though people had less income during the Great Depression, they continued to give, which drags the fraction up. But basically, through both the Great Depression and then through the post-war boom, Americans gave an increasing fraction of their income, while since 1964 there has been a steady decline. There is a little bump in the late 1980s and that is driven entirely by the Reagan tax cut, a one-year change in deductibility which pushed donations into that one year and out of the two adjacent years. Essentially the same graph applies to giving to the

Figure 5

The rise and fall of philanthropic generosity, 1929–1998



Catholic church, protestant churches, the United Way. If you were to look at all these graphs, you would see that it does not have anything to do with any particular recipient organization because the same general pattern applies across all.

Someone said earlier in the symposium that it is reasonable to think that social capital and institutional enforcement might be in some sense alternative ways of providing social order. Social capital does facilitate informal contract enforcement – the logic of that derives from the basic theory of social capital, that is game theory: if I have dense ties and networks of reciprocity with other people then I do not actually have to have a contract with my neighbour: both he and I are going to rake the leaves. We just do it without a contract and I do not sue him if he does not rake his leaves. Thus, if social capital is declining in the US, that might have implications for other forms of contract enforcement. So I thought I would look at the relative share of lawyering in the American economy as a whole and how this fraction has changed through time. In 1900, there were 41 lawyers per every 10 000 employees in the US. In 1970, there were 39. This was a little known Putnam's constant: historically there were about 40 lawyers, plus or minus one, for every 10 000 employees in America. This number was rock-steady over the first 70 years of this century. And then this number started to increase, just as trust and social capital started to decline, so that by now lawyers' share in the workforce has more than doubled.

A corollary to Putnam's law was that there should be one doctor for every lawyer, or one lawyer for every doctor, in America. But that too has changed, because the post-1970 jump in lawyering has not been matched by one for doctoring. Thus, the jump in lawyers per capita is not simply a reflection of a general increase in professionals in America; it is unique to lawyers. In fact, over most of the century, the ratio of engineers to lawyers shifted sharply in the direction of more engineers per lawyer, but since 1970 that trend has reversed. You would think that as a country becomes more technologically intensive, more and more of its workforce would be trained engineers, but in fact since 1970 that trend has completely reversed.

What I claim to have shown so far is that by a variety of different measures there has been a massive transformation of social bonds in America over our lifetime. And it is very important for my fellow citizens and me to figure out why that happened and how we can reverse it.

My responsibility in the OECD context is to talk about the concept of social capital, about the measurement of social capital, and about its consequences. What I have done so far is illustrate how a workaday researcher in the field of social capital looks desperately for different measures of social capital and tries to triangulate among those measures to see if there is any convergence among stories told by different indicators.

My book (Putnam 2000) deals with the extent, causes and consequences of these changes in much more detail. Specifically, it deals with four questions:

The first is, "What has been happening to American social capital?" It has not always been in decline. Within living memory, Americans were spending more and more time playing cards with each other, giving more money, connecting more and more. Suddenly, for some mysterious reason, in the middle 1960s those trends began to reverse and they have been reversing quite sharply over the last 35 years.

The second question in the book is, "Why?" But I am not going to address that question here.

The third question is, "What can we do about it in the US?" I have some ideas about that, but again I am not going to address those here.

The fourth question is, "So what? Does it matter?" That is what I am going to deal with here. What evidence is there for plausibly believing that it is not just a matter of warm cuddly feelings that we are lacking? There are measurable consequences to social capital.

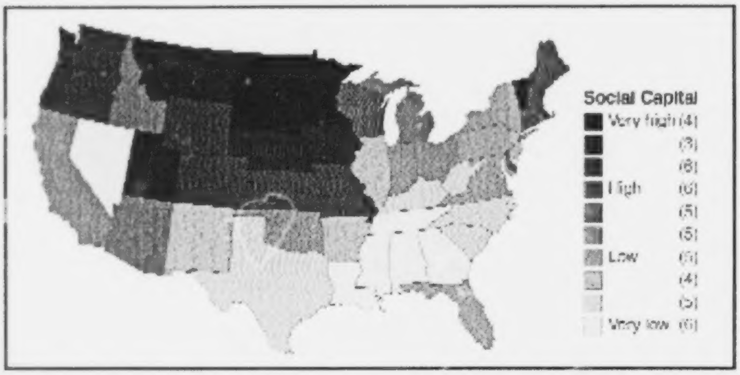
Think of me now as explicating and giving a particular example of many of the generalizations that Michael Woolcock has offered, for example, on the effects of social capital on crime, health, and so on. I am going to talk about those in the particular context of my research project, taking advantage of the fact that in the US we have 50 states, which hold some things constant but not others. Across all the American states, I have developed 13 different measures of social capital. Many of these I have already described: the fraction of people in the state who had in the previous year served on a committee of some local organization, or as an officer of a local organization, the number of club meetings attended, the number of club memberships, the turnout at the presidential election, the number of public meetings attended, and so on.

I have, for the sake of simplicity, combined all of those measures, via factor analysis, into a single measure. You can think of that as the latent variable that is measured by the overlap among all these individual indicators. Operationally what I will mean by social capital in what follows is the degree to which a given state is either high or low in the number of meetings citizens go to, the level of social trust its citizens have, the degree to which they spend time visiting one another at home, the frequency with which they vote, the frequency with which they do volunteering, and so on.

Figure 6 provides a social capital map of the US. It is appropriate, I think, given the venue of our meeting, that the best single predictor of the level of social capital in American states is distance to the Canadian border. Being closer to the Canadian border means more social capital. Actually, if you looked at that graph in more detail you would see that it can be described in terms of a barometric map with one high, centred over Minneapolis-St. Paul, and one low, centred over Baton Rouge, Louisiana. There are probably deep historical roots of that pattern. It is not an accident that the low social capital is very clearly associated with the depth of slavery in the 19th century, and that is because slavery as a system and the post-slavery reconstruction period were institutionally designed to destroy social capital. This is what slavery was about; it was about destroying social capital, because social capital, among Blacks at least, and later in post-slavery, social connection between Blacks and poor Whites would have threatened the structure of power. I am sure it is not an accident that there is a strong correlation between past slavery and current levels of social capital.

Figure 6

Social capital in the American states



There are a few outliers to the general pattern. Nevada is lower than where it should be; perhaps if you know something about Nevada you have guesses as to why this might be true. Utah is higher than where it should be, and this is quite explicable because of the Mormon church.

The other variable that strongly predicts social capital, across the American states, is the pattern of immigration. The best single migration-based positive determinant of social capital is the fraction of the population that is of Scandinavian descent. Another fact is that if you rank Americans today by their level of social capital or social trust or social connectedness, and you rank the countries from which their ancestors come, even as long ago as two or three generations, those two rankings are perfectly correlated, even though the connection between those two streams is on average two or three generations old. If you think of the causal mechanism that must underline that, the concordance is stunning.

Now, that is the laboratory in which I want to offer illustrative evidence of the claim that social capital has powerful effects on lots of other things. The various panels of Figure 7 display a number of pairwise relations between the index of social capital and a number of important social and economic outcomes. These are all partial relations based on multivariate regressions in which everything possible has been held constant because states differ in so many ways.

The general pattern is that social capital drives out other possible competing variables in regression analysis. There is no way to be entirely sure in which direction causality runs. I cannot be sure there is no other causal variable, but I have gone through many potential variables that could make this spurious. That is relevant because the horizontal axis in Figure 7.1 is the social capital index, and the vertical axis a composite measure of educational performance (SAT scores, test scores, high school dropout rate). This is an extremely robust find-

Figure 7.1

Schools work better in high social capital states

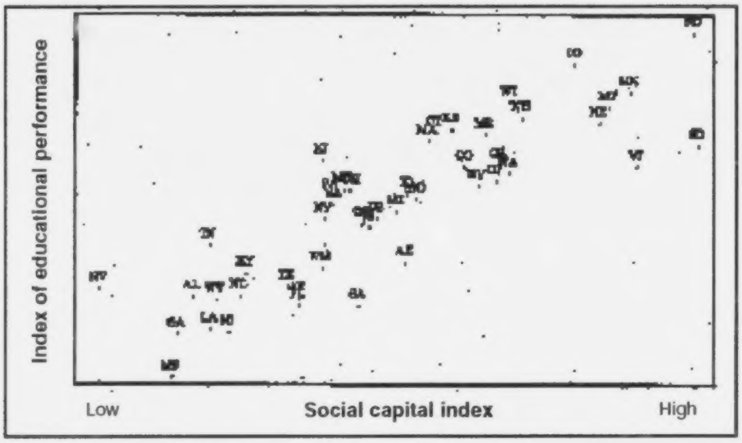
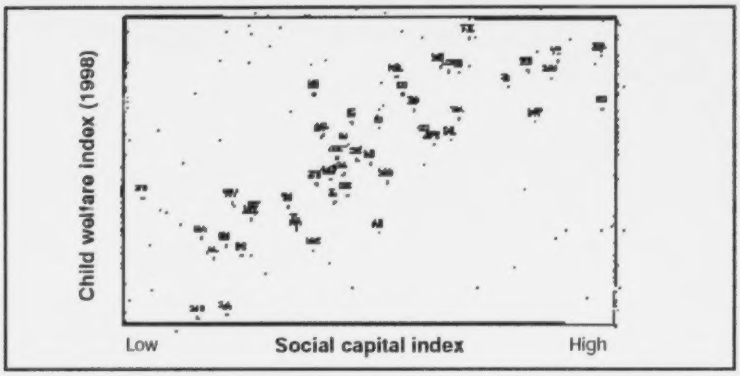


Figure 7.2

Kids are better off in high social capital states



ing; it does not depend at all on which particular measure you use. The relationship shown is strong enough to pass what is known in political science as the inter-ocular trauma test - it strikes one between the eyes.

The relationship between educational performance and social capital is much stronger, two orders of magnitude stronger than, for example - again controlling for everything else - spending on schools or teacher:pupil ratios or any of the obvious things that are more usually thought to increase educational performance. Figure 7.2 shows a composite measure of child welfare (it includes teen pregnancy, infant mortality and a variety of other measures of how well kids do) and again

Figure 7.3

Kids watch less TV in high social capital states

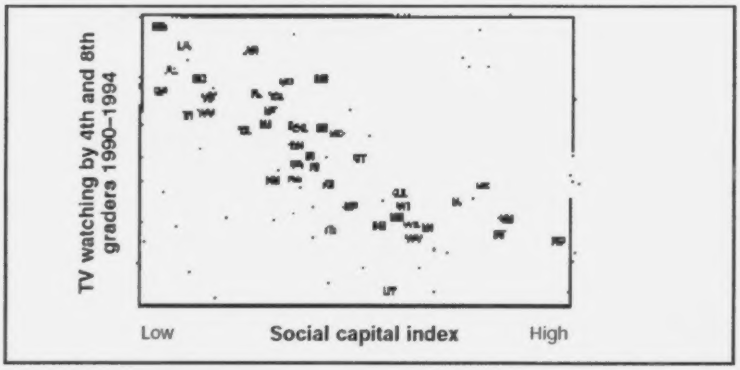
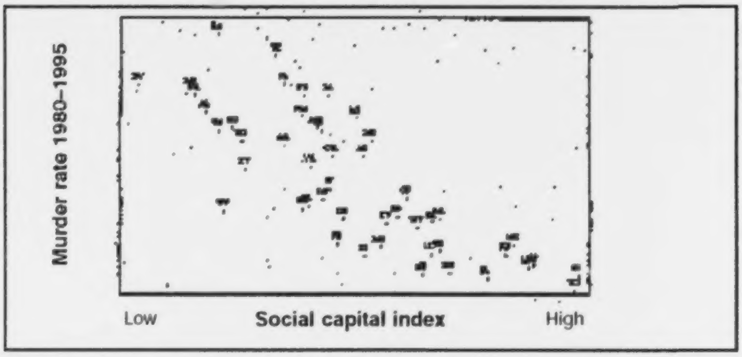


Figure 7.4

Violent crime is rarer in high social capital states



there is a very strong relationship showing that, in general, the welfare of children is higher where social capital is higher. Figure 7.3 shows that states where children watch less television have higher levels of social capital, a relationship I study in much more detail in my book.

Crime is strongly negatively predicted by social capital; this is true at the state level, but it is also true at the community and neighbourhood levels. Once again the strongest predictor of the murder rate is a low level of social capital. It is stronger than poverty; it is stronger than other plausible measures. Figure 7.4 shows that murder rates are lower in states where social capital is higher, and Figure 7.5 shows that people are generally less pugnacious where social capital is high.

Figure 7.5

States high in social capital are less pugnacious

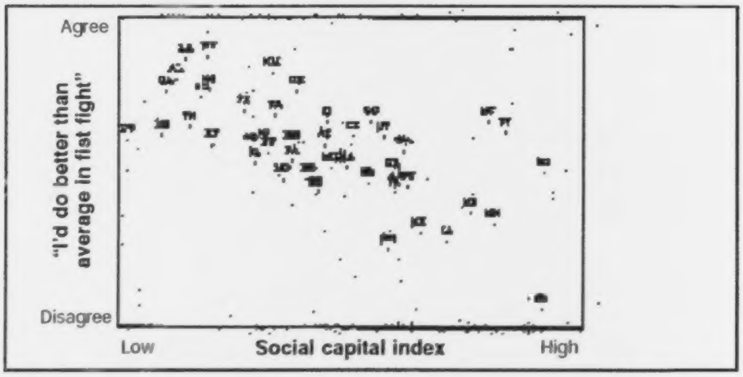
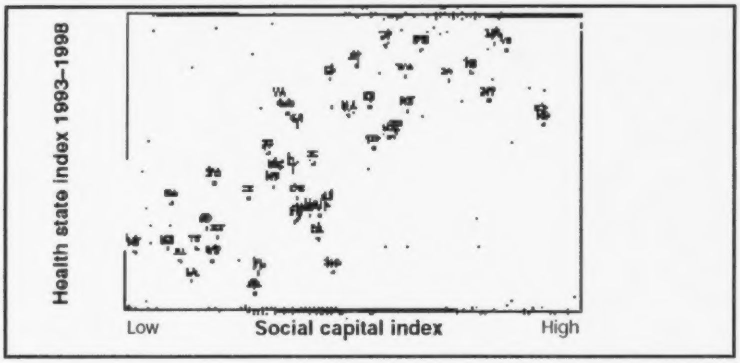


Figure 7.6

Health is better in high social capital states



As Michael Woolcock and other authors have pointed out, there is very strong evidence of powerful health effects of social connectedness. The evidence is strong not only in American states, but also in Finland, Japan and other countries. Controlling for your blood chemistry, age, gender, whether or not you jog, and for all other risk factors, your chance of dying over the course of the next year is cut in half by joining one group, and cut to a quarter by joining two groups. This is not cheating; these are prospective studies. It is not that people who are healthy become joiners; it is clear from the studies that the arrow runs in the other direction, from joining to health. These are big effects, as can been seen in Figure 7.6. Once again, these same results are confirmed by a multitude of individual-level, over-time studies.

Figure 7.7

Tax evasion is low where social capital is high

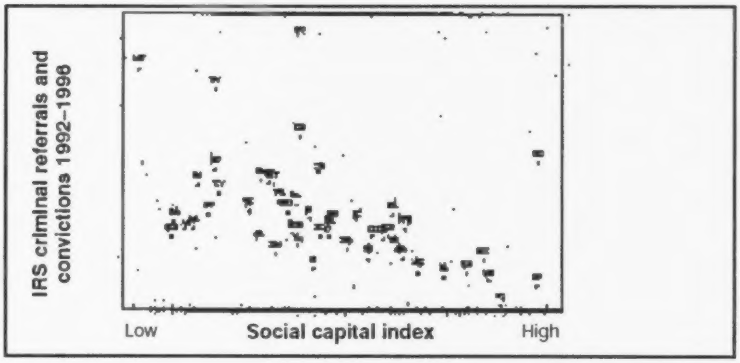


Figure 7.7 shows that interstate variance in the percentage of tax evasion, as measured by the IRS, is strongly related to differences in social capital at the state level. No other variable does as well at explaining why states differ in tax evasion. In other words, where people are connected by dense networks of engagement and reciprocity, they are more likely to comply with the law, very probably because they are more confident that others will, too, so they will not be "suckers" in this dilemma of collective action. Figure 7.8 shows that states where people are more connected with each other are also marked by greater tolerance.

Figure 7.8

Social capital and tolerance go together

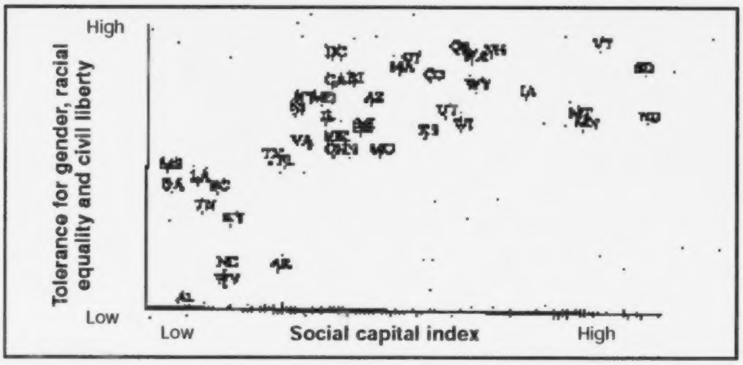


Figure 7.9

Social capital and economic equality go together

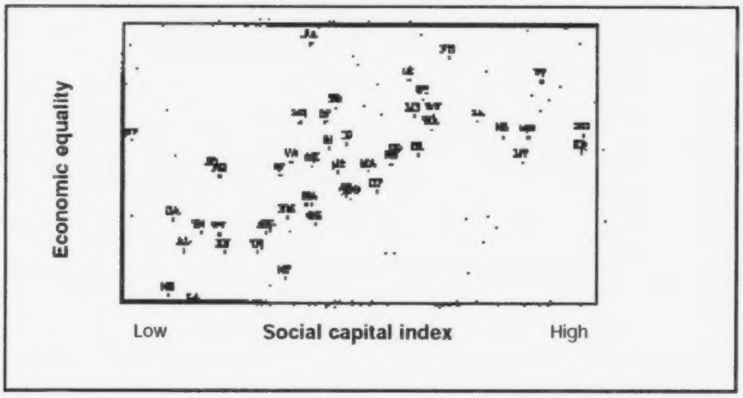
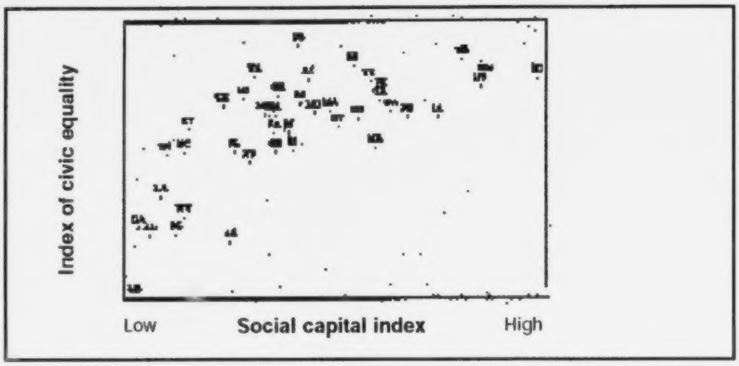


Figure 7.10

Social capital and civic equality go together



Figures 7.9 and 7.10 show that economic inequality and civic inequality are less in states with higher values of the social capital index. Here, the causal arrows are likely to run in both directions, with citizens in high social capital states likely to do more to reduce inequalities, and inequalities themselves likely to be socially divisive.

Finally, I can add some preliminary new evidence to connect social capital to self-assessments of individual welfare. One of the important contributions of this symposium has been to highlight the importance of considering evidence at the individual as well as the community level. Here is another example. Using a combination of the DDB replies to four questions asking individuals for a self-assessment of their own happiness, I have discovered that happiness increases with both their own and their state's measure of social capital. By contrast, an individual's measure of happiness rises if his or her income is higher but falls if the average state income is higher. Thus, although people value their own income more when their neighbours earn less money, people feel better off when either they or their neighbours have higher levels of social capital. At the state level, one's own level of education has a strong positive effect on happiness, but there is no effect from average state levels of education. At the county level, both individual and average education levels have a significant positive effect on happiness. At the county level, the social capital index keeps its strong individual effect, but the general level becomes insignificant, probably because of the increasing measurement error at the county level. The fact that community levels of human and social capital appear to increase happiness, while the reverse is true for income, suggests to me that returns from human and social capital are far broader than whatever positive effects they may have on material standards of living.

But it is important to end with a note of caution. Despite this very wide range of promising results, suggesting that social capital has a multitude of measurable consequences, I am not yet in a position to rule out all other explanations for these patterns. All the relationships in American states that I have shown are quite robust, in the normal statistical sense; that is, they do not depend on which particular measure or which particular year you use. These are robust relationships, and they are controlling for all the other obvious suspects that might be interfering. Moreover, virtually all these state-level studies are consistent with individual- and community-level studies by other researchers. However, we are in the early days of this research. We have got to pummel a lot of different datasets. We must look at lots of micro-level data, not just at the very aggregated level of states. We must also compare data across countries, and we have to do experimental work.

In many of my examples, one could reverse the arrow of the effects of social capital, and tell a story where the arrow runs to social capital instead of from social capital. In the end, it is only going to be through detailed empirical research that the relative importance of the two possible directions of causation can be established. What I have hoped to have established so far is that this is a plausible enough field that it is worth paying more attention to.

But it will be a long time, in my view, before we get to a level of cross-national, reliable measurement of social capital that will allow us to do for social capital what Robert Barro and others have done for human capital. We are nowhere near having the same clear metric as years of education is for human capital and we are certainly not near having that kind of data over time. I do not think the case is closed that social capital is a strong predictor of everything. But I think it is probably a powerful predictor of many things, enough so to make it well worth our attention.

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———. 2000. *Bowling Alone: The Collapse and Revival of American Community.* New York: Simon and Schuster.

8

The Impact of Human Capital on Non-Market Outcomes and Feedbacks on Economic Development

Walter W. McMahon

This paper develops the rationale and empirical methods for measuring the non-market social outcomes of education, plus their feedback effects on economic growth. It also seeks to identify and measure externalities, some of which are included in these feedback effects. As such, this paper situates human capital in a broader framework of measures of social outcomes generally desired for broader economic development and sustainability. Finally, the paper develops the conceptual framework for tracing and measuring the interrelations among these social outcomes, including those social outcomes which are also inputs and are aspects of social capital.

The **direct** effects of education on each social outcome and on economic growth will be distinguished from the **indirect** feedback effects. The indirect effects are externalities because the effect on the outcome in question of a relatively small investment in education by one household is expected to be negligible and, therefore, is not taken into account by the individual or his or her family as they invest in education. Furthermore, the benefits of these indirect effects are not enjoyed by the individual as the direct result of how much he or she invests, but are freely available to all. Beyond this, if one assumes that there is not perfect information, a number of these indirect effects are very unlikely to be known by the average investor, and, therefore, cannot be taken into account as investment decisions in education are made. The feedback effects are also externalities freely available to others because the lags are very long so the benefits are frequently enjoyed only by future generations. It is reasonable to assume that most individuals do not act on the basis of largely unknown and minuscule effects over infinite planning horizons far beyond their own life cycles and those of their children.

These feedback effects and externalities play a very important role in recent endogenous growth models (e.g. Lucas 1988). However, there they are a broad category identified as "the level of education in the community" and are not identified, broken up into a number of separate education impacts, and measured, as they are here.

Throughout, what follows the conceptual framework for estimating non-market returns controls for per capita money income to avoid double counting the market returns to education. The market returns increase money income which in turn can be spent to produce final outcomes, such as better health which is part of the market returns and not of the **net non-market** returns to education. Although these direct and indirect non-market returns can and will be quantified and measured (to a first approximation), as will their interaction, this does not include an economic valuation as is done for increments to earnings and to gross domestic product (GDP) due to education since they do not pass through the market. In the special case of feedback effects from the non-market social outcomes on economic growth, however, there is a market valuation of these feedback effects that will be explicitly identified and measured as a percent of the total monetary returns to education. It is this component that feeds into a computation of a social rate of return that is market based. This has been done by McMahon (1998b) and also by Mingat and Tan (1996), resulting in a narrowly defined social rate of return that still excludes the direct and indirect effects of education on non-market outcomes. Non-market outcomes are estimated by Haveman and Wolfe (1984) and Wolfe and Zuvekas (1997) to be about 50 percent of the total benefits of education.

1. Introduction and Overview

This section will consider first the overall conceptual framework for identifying and measuring the net market and non-market returns to education. The framework for the net market returns in section 2 is based on the new endogenous growth and augmented-Solow models represented here by the Lucas (1988) production function, and the framework for measuring the non-market returns is based on the theory of household production of final satisfactions as represented by Becker's (1965) household production function augmented with externalities. Section 3 then will turn to the identification of separate specific non-market returns to education related to increments in the average education level in the community, and will explain the rationale for estimating the net contribution of education to each outcome.

The measurement of the net impacts of education as well as the feedback effects, some of which occur only after appreciable lags, are measured using a structural model that traces the logic of each of these impacts and their interactions. This structural model is then used for simulations that extend 45 years into the future, about the time each new graduate is in the workforce or still alive. The measures of the net impacts are the increments (or decrements) in relation to a baseline scenario over the time period in question following a policy change: an exercise in comparative dynamics. The policy change chosen is an increase of two percentage points in the rate of investment in education as a percent of gross national product (GNP) which operates through the estimates of typical behaviour of the education sector in the structural model to increase enrolment rates by about 10 percentage points at secondary and two- and four-year college levels in most OECD member countries. Larger, or smaller, policy changes could be chosen but these seem reasonable given the time frame being considered in relation to national education programs that have been implemented recently in some OECD countries (e.g. Greece, Portugal, South Korea). Larger or smaller increments can be interpolated as proportions of the net outcomes chosen for illustration here.

The social outcomes traced are those that are of primary interest to comprehensive economic development with sustainability. All are rather standard goals of economic development. They are health impacts, including greater longevity and reduced infant mortality; increasing democratization, human rights and political stability, and impacts of these on rates of investment in physical capital with feedback effects on economic growth; and impacts on poverty reduction and reduction of inequality, implications for environmental sustainability, and implications for homicide and property crime rates. Indirect and delayed effects are taken into account in the structural model.

The empirical estimates of both market and non-market outcomes of education then are based on simulations of this model. A simulation approach is necessary to capture the feedback effects and the lagged impacts. The parameters of the model are estimated from worldwide data, generally for 78 countries that include the original 22 OECD member nations. The starting points for the prediction of each net outcome in the simulations use data specific to each OECD member country, data that are shown in the Technical Appendix.[1] This worldwide perspective for estimation of the parameters is believed to be the wisest strategy given the nature of the long-term processes under study here and the fact that the variation within the OECD subset of nations alone is not sufficiently wide to lead to very meaningful results. A glance at a few scatter diagrams reveals that most (but not all) of the OECD member nations are toward the upper end of the range, with a range of variation among them that is too narrow to get sufficient variation for valid parameter estimates since they are almost all at a similar stage of economic development. The resulting sample size is also too small. Comparing the Africa, East Asia, Latin America and OECD means for each outcome (as in McMahon 2000) reveals a broad sweep of these long-run processes that is quite revealing. It is reasonable to assume that these processes are continuous at the upper end of each range. Only the stage each nation worldwide is at in each process is "different" and that difference is taken into account by fixing the starting points. There are minor non-linearities as the upper end of the regression line fit to a worldwide scatter diagram is approached that lead to some loss of precision in the estimated impacts, but there are other non-linearities that occur in the middle ranges as well. Other factors contribute to potential variation in outcomes; each structural equation can undoubtedly be refined by others as time passes; there are impacts from the strong personalities of particular leaders (e.g. Nehru's influence makes India an outlier on democratization); and some of the variation is always unexplained. So 100 percent precision in the estimated empirical outcomes should not be expected of first approximations, and a standard analysis of the residuals in particular cases is revealing.

This said, a whole new approach to measurement of the non-market outcomes of education and of the social benefits including externalities is offered. The structural model also endogenizes the key constants of the classic Solow (1956) model (e.g. population growth, saving rates, dissemination of technical change, and political stability), as well as poverty and aspects of sustainability. It is hoped that new insights are offered by this new approach as well as some idea of the direction and general magnitude of each outcome.

2. Market Returns, Non-Market Returns and Externalities

The overall conceptual framework for measuring market and non-market returns will be considered briefly. This should also clarify the role of externalities as they relate to both.

Market-based Measures of Net Returns to Education

The theory of knowledge-based economic growth, and the central role of education in disseminating this knowledge, including the development and dissemination of technology, has been given an enormous stimulus by the new endogenous growth theory (e.g. Romer 1986, 1990; Lucas 1988) and human capital-augmented Solow models (e.g. Mankiw, Romer and Weil 1992) accompanied by empirical tests (e.g. Barro 1991, 1997; Kim and Lau 1996) which all give human capital a central role. This role of human capital in the OECD nations has been studied empirically recently by Healy et al. (1998) and also surveyed by Psacharopoulos (1999). Technology also is very important, including its development which occurs largely in the OECD countries. But it has very little practical effect on economic growth processes unless it is disseminated by education which creates the simple basic capacities to utilize the technology and learn on the job, a bitter lesson learned years ago by international economic development and lending agencies.

The Lucas (1988) production function shown in Eq. 1 captures these effects nicely. It is a useful vehicle for explaining the role of human capital in the growth equation that will appear later as part of the structural model and for explaining the role of education externalities. Lucas identifies the average level of education in the community, H^α, as generating externalities that augment the economic growth process. It is these externalities that we propose to identify and measure as feedback effects from the non-market returns to education that augment economic growth. Although the focus of this paper is on non-market returns and not on economic growth per se, it is necessary that growth be considered briefly to explain the role of externalities (or increasing returns) and feedback effects which the paper does seek to measure. Mingat and Tan (1996) have also recently addressed the size of these feedback effects as a proportion of market-based growth. Specifically, the Lucas (1988) production function specifies inputs in the economic growth process that are used within the firm (i.e. inside the parentheses) including inputs of human capital used on the job, μH, ($1-\mu$, the fraction of time this human capital is used in the home in household production of non-market satisfactions will appear shortly), and raw unimproved labour, N, as measured by the number employed, all contributing to output, Y. The productivity of these inputs by firms is enhanced by externality benefits arising from the level of education in the community:

$$Y = Y(K, \mu H, N, A)\, H^\alpha \tag{1}$$

The output sold in the market, Y, measured as GNP originating within this firm, is produced using knowledge, technology and techniques that cannot be used unless the value of the employees' time is enhanced by formal education. This means basic reading, writing, math and job-related skills embodied in the human capital that workers bring to the job for the fraction μ of their total time. Perhaps most important, this human capital enables them to learn on the job, and to make use of new knowledge, A, created by research and development (R&D). Human capital, therefore, is not a necessary and sufficient condition but it is one of several causal factors contributing to output. It also contributes to output growth when Eq. 1 is totally differentiated with respect to time, as it is for the specification leading to our growth equation (i.e. Eq. 34 in the Technical Appendix).

Lucas' H^α, the average level of education in the community, consists of community effects that are identified as the separate non-market effects of education listed above. They result from the dissemination of knowledge in the community by prior formal education that **directly** aids the firm in increasing productivity, but they also come **indirectly** through education's contribution to other social outcomes. The indirect effects are essentially all externalities and are not taken into account when individual families decide how much to invest in education since the individual's contribution is a very small part of the total, and they are, therefore, "givens" in the community, often the result of investment by past generations. Although the individual may realize privately some of the benefits of investment in education made by others, this is not contingent on his or her private investment decisions. The indirect benefits he or she generates may flow to future generations.

Some of the externalities from education's social outcomes that are components of H^{α} in the Lucas production function are empirically significant but only in specific ways. Democratization, for example, does not appear to impact economic growth directly (Barro 1991, 1997 and Barro and Sala-i-Martin 1995, arrive at the same conclusion), but education does make a significant contribution to democratization (Eq. 8, DEM, in the Technical Appendix) which in turn contributes to political stability (Eq. 10, Technical Appendix). The latter makes a significant contribution to economic growth through its contribution to higher rates of investment in physical capital (Eqs. 38 and 34, Technical Appendix). This is not just true in Sub-Saharan Africa, but also within OECD member countries. One can hardly deny that political instability has contributed to low growth in Northern Ireland, Bosnia, and earlier in Greece, Turkey and Spain (during the civil war). These are long-term processes we are talking about, and **degrees** of democracy and political stability, not dichotomous variables. This is not inconsistent with Barro and Sala-i-Martin's (1995) finding of a significant contribution to growth by the rule of law, since the latter is a component of both the democratization and political/economic stability indices. Education also contributes to other community factors that have positive effects on economic growth, such as lower crime rates (which lower the costs to firms) and the communication of knowledge and technologies useful to firms obtained from libraries and the Internet (which is difficult to quantify). Education also contributes to contract dependability and to trust, which are major components of social capital.

Overall Framework for Measuring the Non-Market Returns to Education

The measurement of the net marginal product of education is based on the underlying theory of household production and the value of non-market time developed by Becker (1965, 1976). Households produce final satisfactions, or Becker commodities, during non-labour-market hours using market goods. A key input is household members' own time whose value has been enhanced by education. Becker's **household** production function is extended here to include external effects:

$$Z = Z(Y, (1\text{-}\mu)H)\ H^{\beta} \qquad (2)$$

Here the Z_i's are the final satisfactions produced; $(1\text{-}\mu)$, the fraction of time that is non-market; H, the stock of human capital measured by the educational attainment within the household; and H^{β}, the average education level in the community representing external effects but in this case on households. As before, Y stands for all goods purchased in the market as measured by per capita GNP. Since this depends on the household's income, which is heavily dependent on the household's education, Y must be controlled for in measuring the **non-market** marginal product of education if double counting the market returns to education is to be avoided. In the Technical Appendix, it will be seen that per capita GNP is included one way or another in every regression that seeks to measure the non-market marginal products of education.

The **direct effects** of education, now on each non-market outcome, are the effects of $(1\text{-}\mu)H$ on Z in Eq. 2. Specifically, they are the partial derivatives of the Z_I's, the various types of non-market outcomes, with respect to $(1\text{-}\mu)H$. After differentiating with respect to time, which converts the stock of human capital (e.g. educational attainment levels) to increments in that stock (e.g. enrolment rates which provide updated additions to the nation's stock), these direct effects are measured by the parameters for gross enrolments in education in each regression.

Many of these non-market benefits are private, such as own health. But some are nearly 100 percent externalities essentially by definition (e.g. contributions to improvements in democracy that benefit future generations). Still others are partly direct private benefits and partly indirect benefits, in which case the latter indirect benefits operating through intervening variables and usually with lags are largely externalities for the reasons discussed above. For example, lower fertility rates may result in smaller families with each family member being better off, a private benefit, but they also contribute to lower population growth rates which is a social benefit in reducing the strain on maintaining a sustainable environment. These indirect effects are the cross partial derivatives from Eq. 2 (e.g. $\partial Z_i/\partial Z_j\ \partial Z_j/\partial\ (1\text{-}\mu)H)$, where the Z_i's are the social outcomes relevant to social well-being and the cross partials trace their interactions. These cross partial derivatives can be calculated analytically from the regression equations, but they compound in complicated ways and with lags so that it will be much more practical to measure these indirect effects by means of simulations.

3. The Rationale for Measuring Particular Non-Market Returns

Turning now to the measurement of education's marginal product in affecting separate specific types of education's non-market outcomes, the rationale for empirical measurement of each specific direct effect is explained below. The indirect effects also will be noted as they occur through intermediate variables in each equation, although as mentioned, they can become complex so that only the first round will be noted.

The numbering system of the sub-sections that follow corresponds to the numbers of the equations of the complete model in the Technical Appendix which can be viewed at the Web address given in note 1. It should be emphasized that there will not be repeated references below to this Technical Appendix, but all of the empirical effects discussed in sub-sections 1–17, 34 and 38 corresponding to these equations in the complete model are documented further there. Also the t-statistics, R^2's, specific data sources, comments on multicollinearity, heteroscedasticity, simultaneity, Baltigi and Li tests, comments on alternative specifications and the theoretical and statistical reasons for choosing the particular equation used, and other technical details are reported there. As discussed above and also in the Technical Appendix, all of the regressions estimating the specific net non-market marginal productivities of education (Eqs. 1–17 and 38) are estimated from worldwide data that include the OECD countries, generally 78 countries. As indicated, in the opinion of the author (and also of Robert Barro in his paper in this volume) this gives much more meaningful estimates of the parameters, including the occasional non-linearity, given that very long-run processes are involved and the limited variation in some outcomes. The growth equation (Eq. 34), however, is estimated from panel data for five-year periods specific to 15 OECD countries. This is the pattern used in the book for the regions of East Asia, Latin America and Africa as well (McMahon 2000, Chs. 3–10) to provide for an additional within-country time dimension for the somewhat more volatile economic growth processes, given that the primary objective with respect to the growth sector is to estimate the feedback effects.

(1) Health and Life Expectancy: Logically, after controlling for per capita income, life expectancy can be expected to increase as infant mortality falls, and also as secondary education becomes more widespread. Completion of secondary education is not completely universal in any OECD member country, and is still far from universal in many. More secondary education permits wider awareness of potential causes of illness, greater capacity to access information if illness occurs, marriage to better educated spouses (which the micro evidence indicates is a source of better health), entry into safer occupations, and also encourages adoption of healthier life styles. Consistent with this, the key empirical determinants of life expectancy in the worldwide cross country data are found to be lower infant mortality rates and higher secondary education enrolment rates, the latter becoming significant after a 20-year lag. Controls for per capita income were used, and other potential determinants were explored. The lag here and elsewhere is necessary to allow a large enough increment in the nation's human capital stock for the effects to become significant, although there may be smaller undetectable effects on health almost immediately.

This result in nationwide data is consistent with micro-economic findings by Cochrane, O'Hara, and Leslie (1980) and by Grossman and Kaestner (1997) who, after also controlling for per capita income, find that those with more education live longer. Life expectancy is to some extent a proxy for good health. Strauss et al. (1993), after controlling for socio-economic status and location in micro-economic data, find strong positive effects of education on health. This control for per capita GNP appears as a determinant of infant mortality rates, which affects life expectancy, as well as being present in the life expectancy equation by proxy through the dummy variables for Africa and Asia since per capita income is lower in these places than in OECD countries.

(2) Health and Infant Mortality: As larger percentages of mothers have more education in the OECD countries, especially at the secondary or post-secondary levels, they are more alert to the way knowledge can be brought to bear to improve their children's health. For example, they are then able to look up health problems in child health books and are more likely to be aware of simple principles such as the need for sterile conditions, the components of good nutrition, the importance of getting help if a child has a fever and the role of vaccinations. Female secondary education enrolment rates are still far lower in some OECD member nations, such as Mexico and Turkey, than in others and somewhat lower than the average for the OECD in others, such as Italy and Hungary (as can be seen in Table 2A in the Technical Appendix). On a gross simple correlation basis, these are the same OECD nations where the infant mortality rates are the highest. In Portugal, where female enrolment rates started rising rapidly in 1990, infant mortality rates fell sharply shortly thereafter.

But this is only a simple correlation. After controlling for per capita income, which also reduces infant mortality, lower infant mortality rates are closely associated with higher female primary and secondary education enrolments in the worldwide data consistent with the rationale, but after a lag of 20 years. Primary enrolment has a smaller and less significant effect than secondary education for females. These nationwide effects are broadly consistent with many micro-economic findings, such as McMahon (1998a, 2000) and Grossman and Kaestner (1997). To mention a few, Strauss et al. (1993) find that the strong positive effects of education on adult health just mentioned have multiplier effects on child health, including infant mortality. Frank and Mustard (1994) find in their study that education enables individuals to acquire knowledge on better nutrition that is associated with a decline in mortality rates, and also with increased life expectancy, which are both related to infant mortality. The evidence also shows that children who received better nurturing in early life are healthier and do better in adult life.

(3) Fertility Rates: Logically, fertility rates fall as women have more education. The rationale is that women not only want smaller families (i.e. fewer and "higher quality" children), partly because the increase in their job market options makes their time more valuable, inducing a shift away from time-intensive activities in the home after they finish their education and toward more human capital-intensive activities, but also because their remaining child-bearing years diminish as they remain in school longer. There is considerable evidence at the microeconomic level consistent with these patterns of continuous reduction in fertility rates and family size as females finish primary, secondary, post-secondary and PhD levels. See Cochrane (1979, p. 146), Michael (1982, pp. 113-35), Moore et al. (1993), Schultz (1993), Dasgupta (1995), Greenwood (1997), Grossman and Kaestner (1997) and McMahon (1998a).

In the worldwide data, consistent with this rationale, fertility rates are significantly lower where female primary and secondary enrolment rates are higher, all with a lag of 20 years. Furthermore, these have a significant interaction with the family planning expenditure in the country. That is, increased education for females reduces fertility rates, but this effect in Eq. 3 is strengthened by family planning programs.

(4,5,6,7) Net Effects of Education on Net Population Growth Rates: The net effects of education on population growth rates follow directly from the above, but with lag effects that are essential to the understanding of the patterns. In the poorest OECD countries, and in Sub-Saharan Africa, the positive effects of more female education on better health with falling infant mortality and rising longevity are dominant at first. It is only after females achieve about nine years of education (by our estimate) that the effects in lowering fertility, which throughout operate consistently in the same direction, become dominant, and net population growth rates start to fall (see McMahon 2000 for the scatter diagrams and graphs). So the Malthusian dilemma can reasonably be expected to continue in Sub-Saharan Africa and South Asia for some years to come (although AIDS may reduce the population explosion, and production, somewhat). Most of the OECD member countries are out of this range and are enjoying slowing or zero net population growth rates at sustainable levels.

(8) Education and Democratization: Democratization is measured by the Freedom House (1997) index, inverted here so "1" represents purely authoritarian, or "not free," regimes and "8" represents full democracy. The level of democratization (i.e. "Political Rights" in the index) is measured annually by Freedom House's evaluation of whether or not there are free elections for the head of government and legislative representatives, fair access for and presence of opposing candidates who have equal campaigning opportunities and the right to organize different political parties, freedom from domination by the military, and so forth (see Freedom House 1997, p. 531). OECD member countries low in this index include Turkey (3), Mexico (4) and Korea (6), with most of the rest near the top at (7). Improvements in the way democracy works (e.g. in the 7 to 8 range) might include continuing expansion of the franchise (percent of population registered, actual voter turnout, etc.), freedom from distortions of the electoral process by political campaign contributions, equal access of all candidates to the airwaves, and reduced corruption. The Freedom House index does not measure these improvements at the top of the OECD spectrum very well, but it is reasonable to assume that they can continue to occur in a continuous fashion, and the ceiling placed on the index at 8 in the simulations described later is somewhat arbitrary.

The rationale is that rising per capita income is associated with a broader middle class, not tied to rural land tenancy arrangements, that seeks broader participation in the political process. Education, particularly at the secondary level or above, contributes to broader awareness and understanding of the issues at stake and facilitates rising participation and refinement of the process over time, as was stressed by Thomas Jefferson long ago when he sought to make education the primary constitutional responsibility of the State.

Since a larger than average military can contribute to military coups and a restoration of authoritarian political structures, it is wise to control for this when seeking to measure the net contribution of education to democracy. Consistent with this rationale, after controlling empirically in the worldwide data for per capita income which is clearly a major empirical determinant of democratization, and military expenditures as a percent of government budgets, high military expenditure as a percent of government budgets makes a significant negative contribution to democratization. Secondary education enrolment rates lagged 15 years make the next most significant positive contribution after per capita income. The primary flow of causation from per capita income (and education) to democratization is consistent with the opinion of political scientists who specialize in this topic (for surveys, see McMahon 1998a, 2000). As mentioned earlier, we find no significant direct effects of democratization on per capita growth, but after a lag and through positive effects of democratization on political stability, there are empirically significant effects of democratization on investment rates that feed back on economic growth. These effects could extend over many generations.

(9) Education and Human Rights: Human rights is the Freedom House (1997, p. 531) measure of civil liberties. It reflects the rule of law, including the degree to which citizens are treated equally under the law with respect to access to an independent judiciary, protections from political imprisonment and torture, a free and independent media, freedom of assembly, free trade unions, free religious expression, and so forth. We are cognizant of the fact that human rights are interpreted in some parts of the world to include access to education, health and some other things, but we choose to stay with the definition used by political scientists in the West as measured by Freedom House, which also keeps our analysis clean since we are treating education (and health) as endogenous in the complete model and as important aspects of social well-being.

The rationale is that the protection of human rights is the result of democratization and the rule of law. Over and above that, legal education promotes functioning court systems and concepts of statute and case law. Furthermore, education in the humanities makes the population more sensitive to equity issues and the importance of equal access to fair jurisprudence. Again, it seems apparent that there is still substantial room for improvement in these matters, even though most OECD member countries are close to the top of the Freedom House index.

Consistent with this rationale, after empirically controlling for income per capita and for military expenditures as a percentage of the government budget, human rights increase directly primarily with the level of democratization, but also with secondary education enrolment rates lagged 10 years (further details in McMahon 1998b, 2000). Secondary education is only significant at the 10 percent level. But higher education may be significant also in the OECD member nations. The rationale is also consistent with observations of how authoritarian regimes that lean against human rights also oppose education in political science, law and the humanities while strongly supporting vocational and technical education.

(10) Political Stability: Political stability (PS) is measured by Political Risk Services (1997, pp. S7–S9) using 13 components of political risk, five components of financial risk, and six components of economic risk. Political risk, which accounts for over 50 percent of the index, gives the largest weight to the rule of law or the lack thereof, civil and external wars, political terrorism, corruption, political leadership failures, and economic planning failures. Financial risk includes loan defaults and expropriation, and economic risk includes macroeconomic instability, inflation and high debt service. In the index, 100 represents high stability, with Greece, Turkey, Italy, Hungary, Poland and Spain scoring relatively low and Switzerland, the Netherlands, Denmark, Germany and the US among the highest.

The rationale for education's contribution is largely indirect, through its contribution to democratization and to economic growth. But it is partially direct as education contributes to those reforms that reduce corruption, macro-economic instability and inflation (via more and better education in economics?), and strengthen civilian control of the military, etc. Consistent with this, the empirical determinants of political stability in the worldwide data are per capita income, which is highly significant, and military expenditures as a percent of government expenditure. After controlling for these, secondary education rates after a lag of 20 years contribute positively at the 10 percent level of significance, as does the degree of democratization.

The importance of this finding is that political stability contributes to higher rates of investment in physical capital in the investment equation, and hence to economic growth. This effect is rather obvious if one looks even casually at the political/economic instability and chaos accompanied by slow growth in many of the countries of Sub-Saharan Africa and Bosnia.

(11, 12) Inequality and Poverty: Inequality in the income distribution is measured by the Gini coefficient. Rising income inequality continues to be a very major problem in the OECD nations, and is shown to be the result primarily of wider inequality in earnings (see Gottschalk and Smeeding 1997, and Sullivan and Smeeding 1997) associated with higher premiums paid to the better educated (see Arias and McMahon 2001). This is to be distinguished from absolute poverty measured as the percentage of income received by the poorest 20 percent of the population. The focus here, however, will be on inequality which is rising in most OECD member countries.

The rationale for the relation of education to inequality is that **who gets the education**, and particularly good quality education given the inequality within the education system, largely determines inequality of earnings and hence inequality in the distribution of income later on. See Psacharopoulos (1977), for example. To illustrate this, the difference in the education policies pursued in East Asia, where widespread access to education early on was accompanied both by fast growth and falling inequality can be compared to the policies in Brazil where there had not been equal access in rural areas. In Brazil, the Kuznets inverted U path was followed instead, and growth has been accompanied by enormous inequality. This process is analysed further and illustrated with scatter diagrams in McMahon (2000). Within the OECD context, as secondary and two-year college enrolment (and completion) rates are increased, inequality in earnings after a lag can be expected to diminish. This makes those who might otherwise have dropped out of high school employable and also reduces the scarcity rent paid to those with some college. (These effects on distribution are different in Africa or South Asia since universal primary education does not exist there.)

Empirically, the most important determinants of reduced inequality in the worldwide data are secondary education enrolment rates lagged

20 years and lower population growth, both significant at the 10 percent level, after controlling for faster per capita economic growth which tends to be associated with falling inequality. Many other potential variables were tested without notable results. But it should be noted that the data on the Gini coefficient are not yet as comprehensive as one might like.

This empirical result is consistent with the rationale, as well as with the findings of various studies based on micro-economic data. Sen (1997), for example, in his study of health and poverty in Bangladesh finds that policies geared toward education specifically for the poor have positive effects on poverty reduction and also on better health.

(13, 14, 15) Education and Environmental Quality: A sustainable environment as measured by the arrest of deforestation and maintenance of water and air quality is not only an important aspect of the quality of life in OECD member nations but also a key aspect of social well-being. Deforestation and wildlife destruction for which it is a proxy is measured by the World Bank (1998, p. 206) as the percentage change in forest land (converted so that positive numbers represent increases in forest land in Table 1 and in the simulations).

The rationale for the relation of education to forestation is through effects that are largely indirect. In particular, high population growth rates can be expected to lead to faster cutting of forests for firewood, building houses and for agricultural use. Higher GNP per capita can be expected to provide the capacity for more rapid establishment of national park systems, and higher education may even contribute directly to awareness and more effective environmental regulations.

Empirically, the direct effects of secondary education were not found to be helpful in reducing deforestation. But consistent with the rationale, the indirect effects through higher per capita income and lower net population growth rates are found to eventually start to reduce the rate of forest and wildlife destruction.

Consistent with this same rationale, water pollution as reported by the World Bank (1998, p. 206, Cols. 7-8), after controlling for GNP per capita, is significantly reduced as population growth rates slow, as poverty is reduced, and as higher education rates increase. The latter represents a direct positive net effect from education, but the indirect effects are more important.

Air pollution is different in that it increases with higher economic growth rates and with the expansion of primary education (which is more relevant in the less developed countries). But after controlling for these, air pollution is reduced as democracy expands and as population growth rates slow.

(16, 17) Education and Crime: Crime rates are measured as homicide rates and as all other crime, which will be loosely referred to here

Table 1

Interaction among social outcome measures

A 1% increase in each row contributes to the percent of 1% shown in each column
Impact elasticities only; total effects after 45 years in denominators across from education change rows

Eqn No.	Social Outcomes	Health and Population LEXP Col 1	In IMR Col 2	TFR Col 3	POPGR Col 7	Democratization DEM Col 8	HR Col 9	PS Col 10	Inequality POV Col 11	GINI Col 12	The Environment DEF Col 13	WATER Col 14	AIR Col 15	Crime Murder Col 16	Property Col 17	Education GER1** Col 20	GER2** Col 23	GER3 Col 24	GDIG Col 18	Labour LFPR Col 29	Per Cap. Growth Col 34
	Health																				
1	Life Expect. LLEXP				(1.30)																
2	Infant Mort. IMR	(-.0331)																			
3	Fertility Rate TFR				1.014																
7	Pop. Growth POPGR									(1.59)	(.912)	13.7***	(3.15)								
	Democratization																				
8	Democratization DEM						0.876	0.815					(-1.49)								
9	Human Rights HR																				
10	Political Stability PS																		0.134		
	Equity																				
11	Poverty POV														0.75						
12	Inequality GINI													1.13	8						
	Environment																				
13	Deforestation DEF																				
14	Air Pollution AIR																				
15	Water Pol. WATER																				
	Crime																				
16	Murder Rate HOM																				
17	Property Crime [illegible]																				
	Education																				
	EDSH	*/.036	*/.012	*/.41	*/.37	*/.19	[illegible]	0.14	*/*	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	*/.20	*/.71	*/.85	*/.20	*/*	[illegible]
	GER (1+2+3)	*/.077	*/.016	*/.51	*/.46	*/.24	[illegible]	[illegible]	*/*	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]				*/.56	*/.084	[illegible]
20	GER1 (-.38)		(-.076)	(-.07)					(-1.45)				4.75								
23	GER2 (.20)	0.09	(-.116)	(.003)		0.246	0.087	0.09	(-2.78)	(.900)	(.062)			(-3.7)****	(15.8)	lnGER2 .02			0.307		
24	GER3 (.15)								3.27		3.27	(-10.7)***									
	Effects from:																				
	Social security SSX/100																		(-6.65)		
	Military Exp.G MILX					(.042)	(.0014)	(.0029)													
32	Unemployment U																				(2.54)
33	Growth in GNPPC		(-.085)			0.13	0.128								1						
35	Growth GN POPGR								0.147	(-.076)											
37	GNP/Cap GNPPC							0.027			0.031	13.4***	(.509)	(2.30)	3.2		2.03	1.94			
38	Investment GDI/GDIG																				2.44

*These direct or total effects from a change in EDSH or GER(1+2+3) have not been computed.

**The effects on enrolments of both genders are approximately the same.

***In the original estimation, WATER was measured as fecal contamination per 100,000 parts of water. When updating to apply to OECD, it is more feasible to measure it as the percent of population having access to clean water, a much smaller number. So this measure of WATER had to be rescaled to have a mean that corresponds to the original measure. Alos, in estimated impacts in Canada, the US and Belgium, the explanatory variable GER3 reaches a maximum of 70, so the influence of this variable is neutralized so the estimated impacts in these three countries are inaccurate. This 70 percent limit does not apply to the OECD average.

****This one coefficient is from a separate equation designed to estimate the direct effects of secondary education enrolments on murder and violent crime rates. The rationale is that when young men are enrolled and attending high school, they are under supervision and are not out on the streets, as well as probably having better peer group relationships than they would have on the streets. Both effects are consistent with micro data-based findings in the criminology literature surveyed in McMahon (1998a).

as property crime, both as measured by INTERPOL (1995). The international perspective offers considerable insight, even though the international crime data are poor. Therefore, US data for the 50 states are used to cross check the tentative findings within the context of one OECD member country.

The rationale, consistent with the criminology literature, is not that academic achievement reduces crime but instead that when young men remain under supervision, either in high school or in a job later on, they are not out on the street getting into trouble (see Speigleman 1968, Ehrlich 1975 and Witte's survey 1997). There are also peer group effects. Since we wish to measure the non-market return to education, it is important to control for per capita GNP. After this, greater income inequality and/or higher poverty rates are expected to be associated with higher crime rates.

Empirical results are consistent with this rationale. Controlling for GNP per capita, homicide rates are higher with higher inequality in the international data. In US data, homicide rates are lower following higher secondary education enrolment rates (no lag) and lower unemployment rates (after a lag of two years). Both of the latter reflect whether or not younger persons are under supervision either in school or by employers in a job. I was unable to test adequately for the net effects of narcotics addiction or of the availability of guns (see McMahon 2000, pp. 144–145).

"Property" crime rates rise with economic growth (in contrast to homicide rates). But after controlling for this, part of which may be a better reporting phenomenon, they are lower with larger percentages of the relevant population in secondary school, with lower inequality, and with lower poverty rates. Both lower inequality and lower poverty rates involve indirect effects from education as indicated above.

Feedbacks on Economic Growth

To measure the feedback effects, the rationale for the determinants of economic growth and investment in physical capital will be considered.

(34) Economic Growth: A growth equation is derivable by differentiating the implicit Lucas production function with respect to time using a few simplifying assumptions as shown in McMahon (2000, pp. 35–38). The one used has been estimated earlier from panel data for five-year periods for 15 OECD countries. The resources were not available to re-estimate this equation for all OECD countries with updated panel data. But the variables that are significant are consistent with those obtained recently by Mingat and Tan (1996) for the 20 highest income countries as shown in the Technical Appendix, although they find more highly significant positive effects from secondary education enrolments in the 19 middle-income countries consistent with the results for East Asia in McMahon (2000, p. 39).

These empirical results all suggest that per capita growth of GNP in OECD member countries is dependent primarily on the rate of investment in physical capital as a percent of GNP but also on human capital investment, especially for college education but more significantly for secondary education in the lower income OECD member countries (which are "middle income" in Mingat and Tan's worldwide data).

GNP per capita in the initial year, 1960 (Y/N60 called "initial productivity" in McMahon, 1984), has a negative sign in all regressions including those by Mingat and Tan (1996, Table 3). This suggests convergence within regions if human and physical capital investment rates were the same (which they are not). The negative effects of under-utilization of labour suggest that the excess capacity in some countries does not help. It was also found that investment in R&D (although ultimately important) does not contribute alone at least within a 25-year to 30-year time frame unless the capacity to utilize the new technologies is embodied in human and physical capital through higher rates of investment in education and in physical capital, which appear necessary for its dissemination. This conclusion is consistent with an even stronger conclusion by Kim and Lau (1996) that technology alone without this human capital and physical capital investment has contributed virtually nothing to growth in East Asia. The complementarities and interaction effects between investment in R&D and investments in human and physical capital are explored much more specifically in McMahon (1992). There the estimates suggest larger direct and indirect effects on growth from R&D through higher education in the five largest OECD countries than in a larger group of 11 OECD countries (ibid, Table 2). Revealing more explicitly the complementarity among the different forms of human, physical and knowledge (R&D) capital, estimates are presented there of Nested CES production functions for the US that reveal a much higher elasticity of substitution between raw unimproved labour and the total capital nest (consisting of physical capital and higher education human capital, both with the R&D-created technologies embodied) than among the different forms of capital within the capital nest. Barro's paper in this volume also finds interaction effects, as do some other papers published recently.

(38) Investment in Physical Capital: The rationale for the determinants of investment in physical capital as a percent of GDP is that prior investment in human capital is necessary to use the new technologies that are often associated with new investment, and also to offset diminishing returns to physical capital. Education is hypothesized to support an export-oriented growth strategy that in turn strengthens the balance of payments, thereby facilitating investment from abroad and loosening the limitation of domestic savings rates. Higher school enrolments, furthermore, induce higher total saving via forgone earnings.

Political and economic stability also are expected to contribute to higher rates of investment since they are attractive to international investors. On the other hand, social security expenditures as a percent of government expenditure support consumption and not investment, so their effect on investment rates is expected to be negative. The empirical results, as already suggested, are consistent with this rationale.

4. Patterns of Effects in the Interactions Among Social Outcomes

There are interactions among many of these social outcomes, so that most outcomes are also inputs generating increments or decrements in other social outcomes. That is, most also act as intermediate goods as distinguished from their direct effects on final non-market well-being. The final effects include feedback effects from non-market outcomes on economic growth.

The size of each of these interactions is based on the regression coefficients that are estimated from worldwide data for the non-market social outcomes. They are shown in the complete model which is Table 1A in the Technical Appendix. They have technical properties that are discussed in detail there. To interpret them easily for policy purposes, they are converted to the elasticities shown below in Table 1. These elasticities are calculated at the OECD-country means, so that a 1 percent increase in the "social outcomes" listed in rows 1 to 38 (corresponding to Eqs. 1 to 38 in the Technical Appendix) leads to the percent change in the social outcomes shown under Cols. 1 to 34. All of the mnemonics in the column headings are defined in the same sequence in the first column on the left except GER 1,2,&3=Gross Enrolment Rates, primary, secondary and higher education, respectively, and LFPR=Labour Force Participation Rates, and in the first column EDSH=Education's Share (as a percent of GNP). The lags in years are shown as (-15), (-20) or -2, s-5, and so forth. The data sources for each variable as well as more detailed definitions of each are given in the Technical Appendix as well as in the book (McMahon 2000).

Many cells in Table 1 are blank because there are entries only if there is a significant interaction among social outcomes that reaches at least the 10 percent level (90% confidence level). The research has been extensive in testing for possible cross effects. But many that one might logically be expected were not found to be empirically significant, and others that have no potential causal relationship that can be inferred from the logic of the theory and the lags are also not included. Of course, future research by others may detect effects that could not be empirically documented here.

Finally, it is extremely important in interpreting Table 1 to realize that it includes only the direct effects based on the coefficients and none of the indirect or feedback effects. It is for the purpose of

including these indirect and feedback effects, which the author regards as the true total effects of education, that the simulations of the model are done and reported later below. The direct effects are partial effects somewhat analogous to dynamic impact multipliers. The further feedback effects and interactions are generally considerably larger, but they and the time forms of the lagged responses can be measured only by simulations over a longer 45-year or so time period.[2]

Interactions Among Non-Market Social Outcomes

Although some of the non-market outcomes are not as susceptible to being changed directly by policy, it is nevertheless suggestive to consider potential response elasticities to changes in them. Education, however, is a policy variable that significantly affects all of these outcomes, including the indirect feedback effects that are crucial to sustainable growth, a sustainable environment, and the sustainability of other social outcomes. So it will be considered last.

Health Interactions: Improved **health status** in form of a 1 percent increase in life expectancy (Row 1, Col. 7) is estimated to lead to about a 0.65 percent increase in population growth rates if life expectancy is 50 years (1/2(1.30), noting that it is measured as an inverse). Life expectancy is also partly affected by reductions in infant mortality (-0.021%, Row 2, Col. 1). Both of these interactions are quite apart from the effect of both health improvements on citizen well-being directly. One percent higher population growth rates in turn (Row 7) are a source of a 0.079 percent increase in inequality (Col. 12), a 0.962 percent reduction in forest lands (Col. 13) and a 13.7 percent increase in water pollution (Col. 14). The adverse relation of population growth to inequality and forest land should not be a problem in OECD countries and in Canada where population growth rates are low, but is a very serious problem in Africa and South Asia where population growth rates are higher. In the higher per capita income OECD countries, the effects of improved health status on population growth have already been largely offset by the effects of education in lowering fertility rates (-0.52 after 45 years in Row 19, Col. 3).[3]

No significant relation between population growth and economic growth in the OECD countries was found, although there is such a relation in Africa (McMahon 2000, ch. 5). Consistent with this, Mingat and Tan (1996, Table 3) find no significant effect, and their negative relation of population growth to per capita economic growth in middle-income countries (-0.029) and positive relation in high-income countries (0.024) are also offsetting.

The effect of increased female education to reduce fertility rates (Table 1, Rows 20 & 23, Col. 3) is likely to be the most important in those OECD member countries with lower per capita income (Greece, Mexico, Poland, Ireland, Portugal or Turkey), given its contribution to reduced deforestation, water pollution and inequality (e.g. Row 7, Cols. 13, 14, and 12).

Democratization, Human Rights and Political Stability: The estimates in Table 1 suggest that a 1 percent improvement in democratization contributes about a 0.6 percent improvement in human rights and about a 0.8 percent improvement in political stability (Row 8, Cols. 9 and 10). A 1 percent improvement in political stability is estimated to contribute a 0.154 percent increase in the rate of investment in physical capital (Row 10, Col. 38), which in turn contributes 0.36 percent to increased growth (Row 38, Col. 34, 2.44/[1/0.15]). Another interaction comes from the contribution of higher total enrolment rates in education to 0.084 percent higher labour force participation rates, particularly among women (Row 19, Col 29), which leads to less under-utilization of potential labour (Eq. 32 in the Technical Appendix) raising per capita growth (Table 1, Row 32, Col. 34).

Inequality: Expanding access to secondary education by 1 percent is estimated to contribute to a 0.306 reduction of inequality (i.e. reducing the increases in inequality) in OECD countries (Row 23, Col. 12).

A 1 percent reduction in inequality (in the Gini coefficient) is estimated to contribute in turn about a 1.13 percent reduction in the murder rate and a 5 percent reduction in "property" crime (Row 12, Cols. 16 & 17). A 1 percent reduction in poverty is also estimated to be associated with a 0.78 percent reduction in property crime (Row 11, Col. 17).[4] A 1 percent increase in GNP per capita is estimated to be associated however with a 3.25 percent increase in property crime rates (Row 37, Col. 17), but this may be partly because of better reporting. So the net effect on property crime rates depends on whether the wider access to and enrolment in secondary education and its effects in reducing inequality and poverty are together strong enough to offset the effects on crime from faster growth.

Environment: Environmental quality has important final outcomes on the quality of life and on forest, wildlife, water and air quality sustainability. We were unable to detect interactions of water and air quality with health, although there must be some. It is interesting that the worldwide evidence suggests that a 1 percent improvement in the functioning of democracy, including the rule of law, contributes a 1.92 percent reduction in air pollution, presumably through better enforcement of environmental regulations (Row 8, Col. 15). Higher education contributes to lower water pollution, presumably for the same reason (Row 24, Col. 14). But the evidence is that the effects of pure economic growth on deforestation and air pollution (after controlling for human capital) are adverse. That is, the deterioration of the environment is likely to persist unless offset by investments in education, suggesting that environmental health may not be sustainable without interactions with other forms of social capital.

5. Simulations Estimating Impacts of Education in 22 OECD Countries

Turning now to the estimated impacts of education after 45 years, the results of simulations using the complete model in the Technical Appendix are summarized in Table 1, Rows 18 to 24 (in the denominators) and even more clearly in graphs for a hypothetical "typical" OECD country and for Canada below. Simulations for 21 other OECD member countries are in the background paper by McMahon (1999).[5]

The results of the simulations **are not predictions**, but instead estimate the **net** effects of a specific education policy change. These **net** effects are the focus here, not the baseline scenario which will be referred to as an endogenous development scenario. The pure economic growth component of this base scenario is merely an extrapolation of each country's last 10-year growth record. But the 33 non-market outcomes for which there is also an endogenous development scenario, including education enrolment rates, will continue to grow or decline from current levels as generated endogenously.[6] (See Table 1, Row 37, Cols. 23 and 24 for the continuing growth in enrolments, for example). This endogenous development scenario generates baselines for all social outcomes from which to measure the incremental effects of specific education policy interventions.

Policy Changes Increasing Human Capital Formation Through Education

The policy change chosen for the simulations is a 2 percentage point increase in investment in education as a percent of GNP. This gives rise to an increase in secondary education enrolment rates first in those OECD countries where completion of secondary education is not yet universal. Then the increased investment is funnelled primarily to the expansion of college two- and four-year enrolments. This investment would build schools, train and hire teachers, and provide education for additional students. A 2 percentage point special increase in public investment in education as a percent of GNP may seem to be a relatively large amount for a single year, but in the longer time perspective taken here it is realistic and may be small. For example, poor countries like Indonesia spend about 3.2 percent of their GNP on education, whereas OECD member countries spend 5.4 percent of their GNP and the highest per capita income OECD countries spend even more. It is 6.8 percent in the US, 8.3 percent in Norway and 8.4 percent in Denmark, for example. The latter is over 5.2 percentage points higher than in most poor countries. Elasticities showing the response to a much smaller 1 percent increment in education's share (EDSH) (i.e. not even a 1 percentage point increment), or in enrolments, GER, which show the same thing in a different way, are shown in Table 1, Rows 18 to 24.[7]

Patterns of Response to Human Capital Investment

Panels tracing net impacts of this increased human capital formation on social outcomes graphically are shown for a "typical" OECD country and for Canada, our host country. The starting values for this "typical" OECD country are the OECD mean for each variable. The starting values for all OECD member countries are shown in Table 2A in the Technical Appendix. Comparable graphs showing the full simulations for the remaining 21 OECD countries for which simulations were run are in the background paper done for the OECD by McMahon in September 1999. They are: 1) High per capita income as measured by Purchasing Power Parity (PPP), from the World Bank (2000) – Austria, Belgium, Canada, Denmark, Japan, Norway, Switzerland, US; 2) Middle income – Australia, Finland, France, Germany, Italy, the Netherlands, Sweden, UK; and 3) Low income – Greece, Ireland, New Zealand, Portugal, Spain and Turkey.

As investment in education increases, secondary and higher education gross enrolments increase in the "typical" OECD country and in Canada. The net changes in social outcomes are shown in all graphs by comparing the Endogenous Development scenario (#1) marked with diamonds to the "after the policy change" scenario (#2) marked with black squares. Gross enrolments at the secondary level can be seen to exceed 100 percent as is frequently the case because they measure the number enrolled as a percent of the high school age group, which includes some over-age students. These gross enrolments are what must be financed, and also they are the measure most relevant to the total impacts of education.

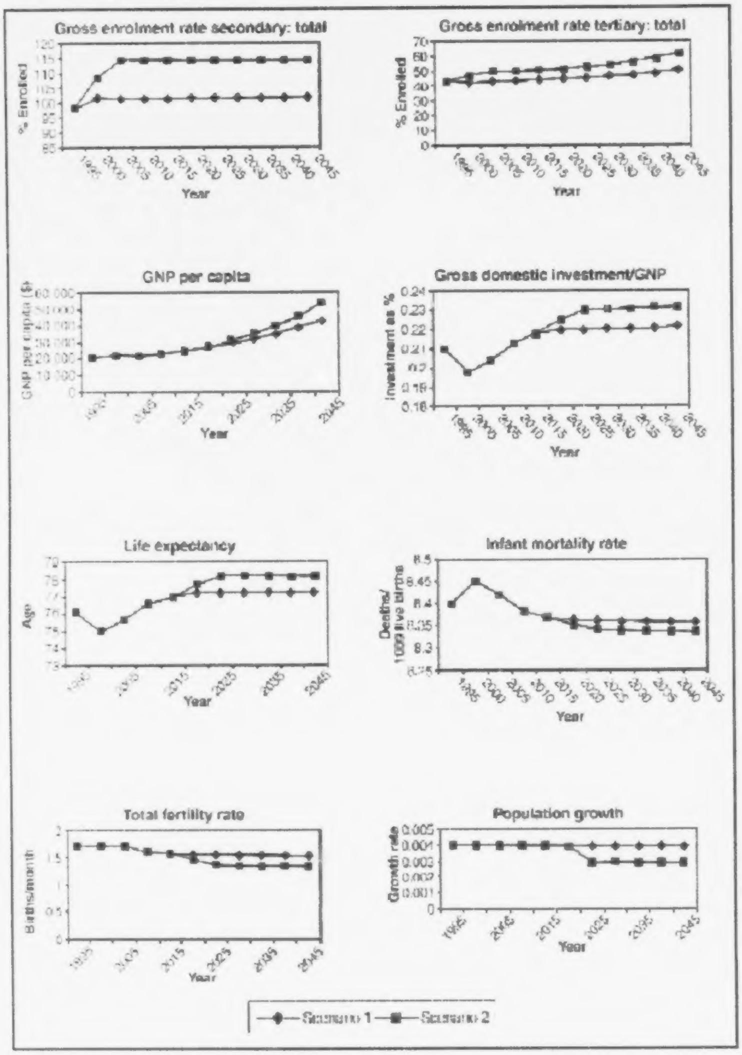
Figures 1.3 and 2.3 show that there are detectable increments to economic growth after a lag of about 25 years. This is consistent with the rationale that suggests that this is due to the greater skill of the labour force and capacity to learn on the job, but it is also due to feedback effects (measured below) from education's effects on other social outcomes. One of these feedback effects comes through the higher rates of investment in physical capital shown in Figures 1.4 and 2.4 that responds to greater political and economic stability (Figures 1.11 and 2.11).

Life expectancy rises in the OECD and in Canada after a lag of 25 years (Figures 1.5 and 2.5). Infant mortality rates fall (Figures 1.6 and 2.6), fertility rates fall (Figures 1.7 and 2.7), and as the net result of all of this, population growth is lower (Figure 1.8). Of the countries studied, these health and population effects are the most pronounced in Canada, Japan, Australia, Italy, UK and Greece. In extremely poor countries, population growth rates rise at first, but all of the OECD member countries have reasonably high female secondary education enrolment rates so net population growth is slow in spite of the effects of the higher enrolment rates on better health and increasing longevity.

Figures 1.1–1.16

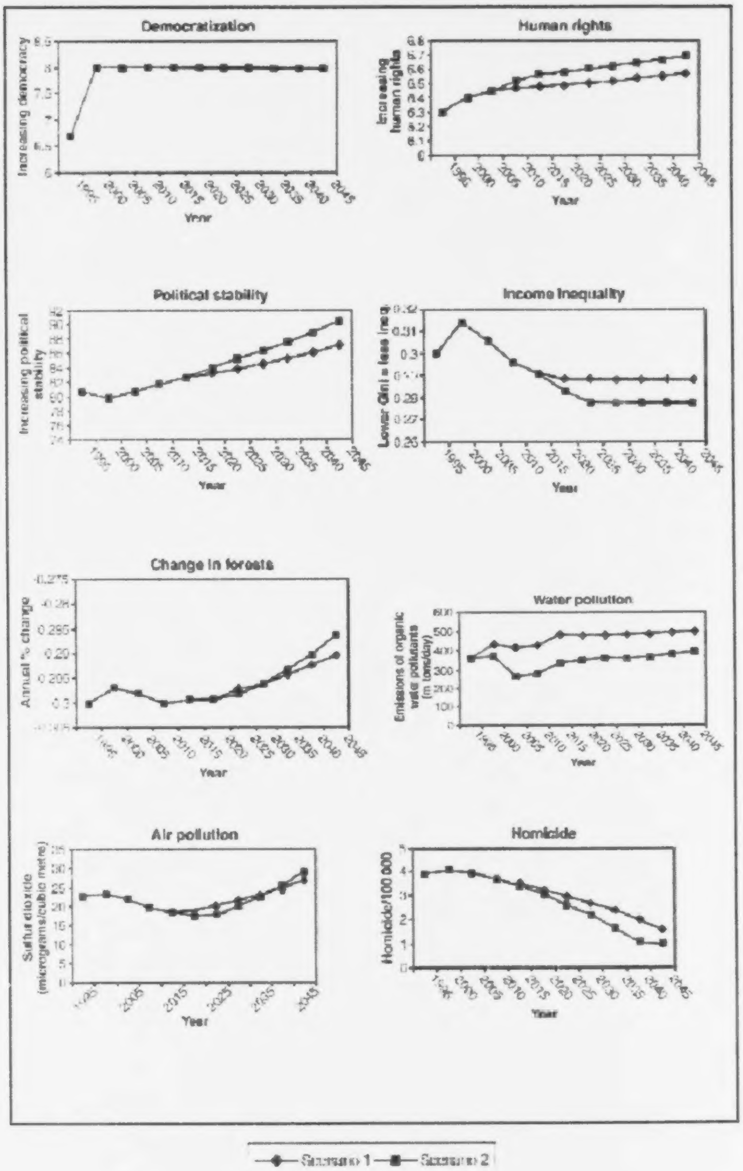
OECD Simulation
Estimated policy impacts on economic growth, health and fertility

Scenarios
1: Endogenous development
2: IH/Y = +2 percentage points



Figures 1.1–1.16 (cont'd)

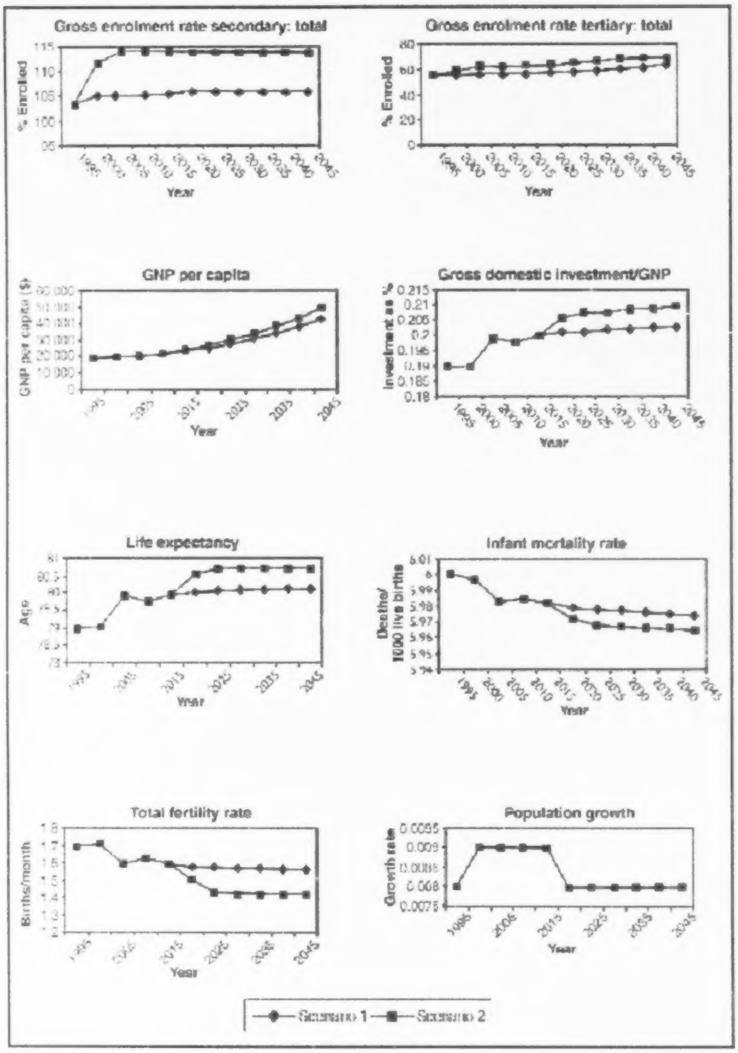
OECD Simulation
Estimated policy impacts on economic growth, health and fertility



Figures 2.1–2.16

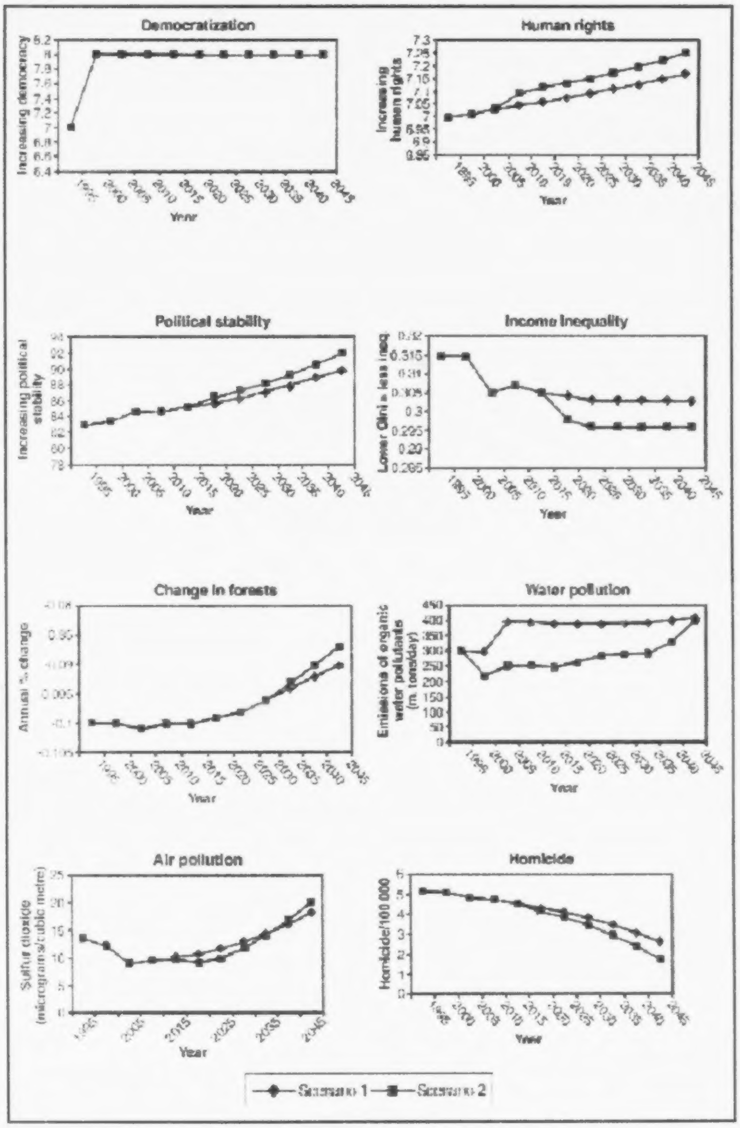
Canada
Estimated net non-market and equity impacts of education

Scenarios
1: Endogenous development
2: IH/Y = +2 percentage points



Figures 2.1–2.16 (cont'd)

Canada
Estimated net non-market and equity impacts of education



Democratization is already high in the "typical" OECD country (6.71 in Table 2, Technical Appendix and in Figures 1.9 and 2.9) as well as in Canada (7.0). It rises to 8.0 within 10 years, although it would appear that the Freedom House index is not as yet sufficiently fine-tuned to pick up significant improvements in the democratic process at this upper end. Human rights, however, do not start as high in the OECD average (6.3), although they start higher in Canada. They include such things as equal access to the courts and improve with more education and faster economic growth after a lag of about 25 years in both graphs. All three of these (democratization, human rights, and higher per capita income) contribute to increased political and economic stability on average and in Canada specifically (Figures 1.11 and 2.11), which in turn feeds back on the growth process (Eqns. 38 and 34, Technical Appendix).

Inequality is reduced after this investment in education that increases the percent completing high school and enrolling for Associate and Bachelors degrees (see Figures 1.12 and 2.12, OECD average, and Canada). This effect on inequality is important to consider, given the rising inequality in earnings in the OECD countries (Gottschalk and Smeeding 1997, Sullivan and Smeeding 1997).

Environmental impacts are delayed, partly because the effects of more education are indirect. But after about 40 years, the rate of destruction of forests and wildlife is finally reduced (the upward bend in Figures 1.13 and 2.13, OECD and Canada), even though the destruction of forests continues. Water pollution is reduced to below what it would otherwise be sooner. But air pollution is more intractable and it is not until 45 years have passed that a small positive increment is noticeable. In the places where deforestation rates are the worst, Greece and Ireland (Table 2, Appendix), after a shorter lag of 25 years these adverse trends are reversed (background paper by McMahon, Sept. 1999).

Finally, the net contribution of increased education to lower homicide rates is apparent in the last panel in the "typical" OECD country and in Canada. Although they start at four homicides per 100 000 in the OECD on average, and five in Canada (see Table 2A in the Appendix), they are currently at a very high eight per 100 000 in the US. So these effects of higher high school completion rates and larger percentages of young men in community colleges are especially significant there.

6. Externalities

The policy significance of externalities is that they offer some guide as to what percentage of education investment must be financed publicly if the non-market and indirect benefits that are externalities are to be realized. Furthermore, since externalities feed back on the growth process. if they are not supported growth is likely to slow down (e.g. Rioja 1999), although if public expenditure becomes excessive, it may be detrimental. If democracy and human rights, for example, are taken for granted as something which cannot be affected by more education of one individual, and if the benefits of education go to others and cannot be secured privately, there is no incentive for individuals or their families to invest in education, and there will be under-investment.

To measure **the indirect effects, almost all of which are externalities**, the model was specially programmed to measure the **direct effects of education** on each social outcome. This was done by letting all other explanatory variables in each equation except education, which is changed, and the dependent variable follow the endogenous development scenario. Then, from the resulting values, the values of the dependent variable given by the pure endogenous scenario (base solution) were subtracted to obtain the net **direct** effects (shown for most social outcomes for all countries in the background paper by McMahon (1999). These net direct effects of education were then subtracted from the total effects to obtain the indirect effects. These are externalities, as well as some of the direct effects such as those on democratization which are a benefit to others and future generations.

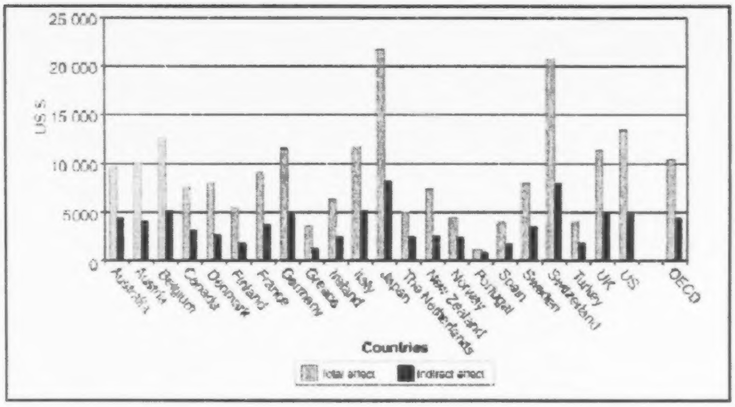
Social Outcomes and Feedback Effects on Economic Growth

Some of these indirect effects feed back on economic growth for each country. These indirect effects are shown beside the total effects in Figure 3. The back-up numerical simulations for each country generating the bar charts in Figure 3 appear in the background paper (McMahon 1999).

For the "typical" OECD country shown farthest to the right, the externalities as measured by the indirect effects only, and after 45 years, average 40 percent of the increments in per capita income. This would seem to be pretty typical of the proportion in all of the individual OECD member countries shown, although the total, and indirect, impacts are larger in some countries than in others.[8] In very poor Sub-Saharan and South Asian countries, externality benefits show up as a larger percent of the total, due largely to the long-run contribution of education to greater political stability and lower population growth. **The fact that externalities were still growing as a percentage when the simulations were stopped (at t+45), and that some direct non-market effects in addition are externalities, suggests that the 40 percent estimate may be conservative.** Forty percent of GNP per capita places an economic value on these externalities.

Figure 3

Total and indirect effects on GNP/capita at t+45



Non-Market Social Outcomes: Indirect Effects

The tentative estimate is that about 75 percent of the effects of education on non-market social outcomes appear to be externalities. This is based on Figures 4 and 5 which show the percentage of the effects that are indirect and the percentage that are direct effects.

A full 100 percent of the indirect effects can reasonably be thought of as externalities, which are the lightly shaded parts of the bars. This is essentially all of the effects of education on POLITICAL STABILITY, WATER POLLUTION and HOMICIDE, most of the effects on AIR POLLUTION and DEFORESTATION, about 50 percent of the effects on PROPERTY CRIME and DEMOCRATIZATION (not shown), and about 25 percent of the effects on HUMAN RIGHTS.

Some of the direct effects, which are the shaded black parts of each bar, are also externalities. In particular, all of the direct effects of education on reducing inequality and expanding democratization and human rights can reasonably be assumed to be externalities either by definition or because most of these kinds of effects of education benefit future generations still unborn. This 75 percent estimate of externalities as a percent of all nine non-market social outcomes (eight shown in the OECD simulation, plus DEM) is based on giving them equal weights, lacking more appropriate weights as given by society or by a Bergson social welfare function. This, therefore, must be regarded as a rough first approximation.

The DEFORESTATION and PROPERTY CRIME bars that extend into negative ranges indicate that there are direct effects of education that reduce the acres of land in forests and reduce property crime rates

Figure 4

OECD simulation – Direct and indirect effects as % of total

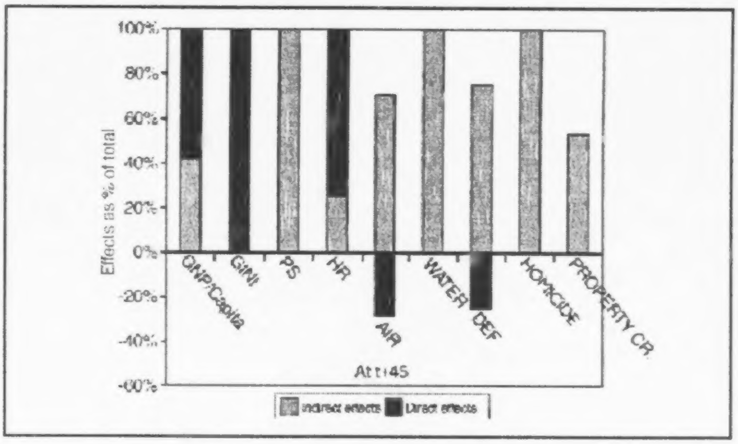
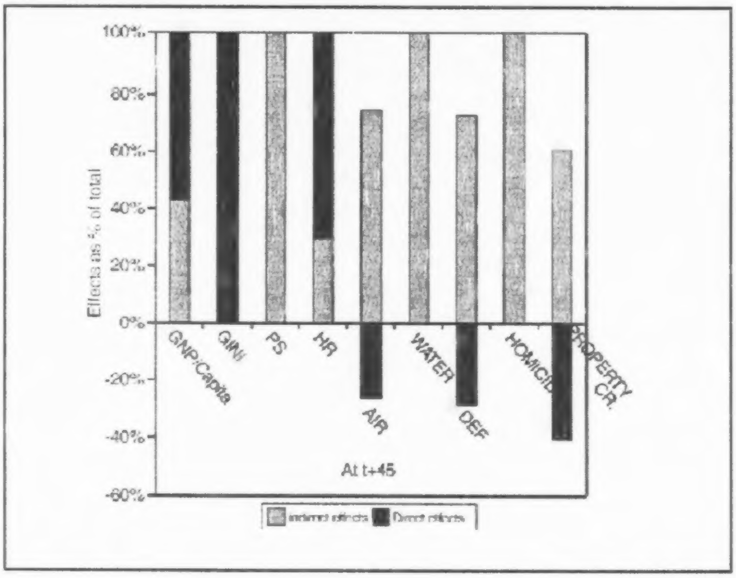


Figure 5

Canada – Direct and indirect effects as % of total



(see Eqs. 13 and 17 in the Technical Appendix). But there are indirect effects of education that increase the land in forests and property crime rates such as rising GNP per capita. This latter is a negative externality of education. But it is offset by positive externalities from potential reductions in poverty and inequality (for PROPERTY CRIME) such that the total effects from education at t+45, direct plus indirect, improve social well-being in this respect. In the case of air pollution (AIR), the direct effects of basic education appear to increase it, as does GROWTH, another negative externality. But the indirect effects of this incremental education via slower population growth and democratization are associated with reduced air pollution.[9]

Almost all of the **direct** benefits of education to better health (not shown in Figures 4 and 5) can be regarded as private benefits enjoyed by the family that has done the investing in education, including reduced infant mortality and greater longevity. There are indirect feedback effects from better health through rising per capita income that are also private benefits. There may be some spillover effects from private health on better public health. But there are also feedback effects from lower fertility rates that eventually lower population growth rates that are very important social benefit externalities in the poorest African and South Asian countries. (The direct/indirect health effects are not computed here but are in McMahon, 2000, pp. 237–239).

7. Conclusions – What Is New, Interesting and Useful?

This has been a first effort to identify and measure comprehensively a range of specific social outcomes from increased human capital formation through education, to distinguish direct and indirect effects, and to identify and make a first approximation estimate of externalities. The latter suggests that education externalities are not a simple matter of a broad-sweeping spillover effect from the level of education in the community. They are instead a whole series of different measurable net outcomes, many but not all of which are indirect effects operating through intervening variables, and some of which are direct effects on non-market outcomes. Some of these more specific externality effects are strong and others weak, most are positive and some are negative, and most are only partially realized after initial impacts and are more adequately measured after allowing for sustained lags. We have been vaguely aware of a few of these externality effects for decades, such as Jefferson's stress on the relation of education to democracy, a notion that may even have been around since Socrates. But the nature of some of these effects, both direct and indirect, and the length and nature of the lags are surprising.

There are further interactions among these social outcomes that we have sought to identify and measure in percentage change terms so that they can be put to other uses (with appropriate cautions). And finally, there are feedback effects from these non-market social outcomes on economic growth which we estimate account for about 40 percent of per capita economic growth. This 40 percent for the OECD nations which is the estimate in this paper is not far from estimates made for East Asia or Latin America, and a bit lower than for Africa where there is great political instability, each of which is based on region-specific growth equations (McMahon 2000).

Further, a tentative first approximation of the percent of non-market outcomes that are externalities is placed at 75 percent. If these non-market outcomes are approximately of equal value to the market-based outcomes as estimated by Wolfe and Zuvekas (1997) using the "cost-based" Haveman and Wolfe (1984) method of valuation, and if indirect feedback effects and hence externalities are about 40 percent of market outcomes, then externalities can be estimated to be about 57 percent of total market plus non-market education outcomes, that is (75+40)/2. This has substantial implications for the percent of the financing of all education that needs to be public, and the percent that it is possible to finance privately.

From the point of view of sustainability of the growth and development process, there are several implications. Considering first pure economic growth, within the context of the new endogenous growth theory, human capital (and R&D) investment and the externalities as they are disseminated offset diminishing returns to physical capital. Instead of arriving at a steady-state solution with zero per capita economic growth, these externalities (perhaps affecting returns to scale) make possible, in principle, per capita growth without bounds. This is the key to the longer run sustainability of positive and hopefully reasonably high per capita growth rates.

But the sustainability of improvements in the other social outcomes that constitute true development is also important to consider. The most obvious is the sustainability of the natural environment, the forests and wildlife, air pollution, and water pollution in particular. This paper has shown how further expansion of education contributes, but in about 80 percent through indirect effects and only after 45 years or so, to significant reductions in the rate of deforestation, reductions in water pollution, and to relatively small reductions in air pollution in the "typical" OECD member country, as well as in Canada. This 45-year period is not sufficient to attain true sustainability (e.g. zero rate of destruction of forests and wildlife, zero water pollution) without other measures, but it is sufficient to get things headed in the right direction.

Roughly the same is true for the other social outcomes for which the concept of sustainability is relevant. Rising inequality is reversed, for example, and inequality reduced in the simulations following an expansion of the percentage completing high school and two-year or even four-year college programs. This is important to the sustainability of a viable community and ultimately to political stability. and also makes a useful contribution to lower homicide rates in the simulations. Finally, a net contribution is made by continuing to expand female education to slowing population growth rates at given rates of immigration, approaching zero population growth in the "typical" OECD country which is surely a sustainable level.

This is a new approach in that it considers **structural feedback** effects that often occur only after lags. It also explains, or makes endogenous in a shorter run intermediate period in which capital deepening continues to occur, the constants in the well-known Solow model that have limited its empirical applicability. The incorporation of variation in these important factors also goes a long way toward taking variation in "cultural" factors among countries into account. That is, the approach offered here has augmented the Solow model with investment in human capital, and endogenized the key Solow constants that depend on human capital formation. They include population growth rates, the rate of technical progress (via investment in higher education and R&D, but most especially the dissemination of technology via education without which technology has little economic impact), domestic saving rates (defined to include forgone earnings, induced as enrolment rates are increased) and political/economic stability.

Notes

[1] The Technical Appendix is not published in this volume but can be viewed online at http://www.hrdc-drhc.gc.ca/stratpol/arb/conferences/oecd/home.shtml or at http://www.oecd.org/eis/conferences/quebecity.htm.

[2] Total elasticities that include these indirect effects can be calculated analytically (just as can dynamic impact multipliers or equilibrium multipliers as time goes to infinity). But the calculation becomes very complex as is shown in the background paper prepared for the OECD (McMahon 1999).

[3] The negative relation of population growth to air pollution in Row 7, Col. 15 should probably be ignored. It is more likely to be a spurious correlation due to high population growth rates in agrarian LDCs where air pollution is low than a causal factor called for by the rationale.

[4] The size of the coefficients in the Poverty equation should be discounted in applications to the OECD countries given the slightly different way absolute poverty was measured in the regressions.

[5] Simulations for a few countries that have joined OECD more recently could not be done because there are inadequate data available on some of the variables.

[6] The economic growth rates for the base scenario path are set to be identical to the actual real rates of growth in per capita GNP for 1985–95 for all of the 22 OECD countries in the model except for Canada and Japan. Looking into the future, the continuation of the unusually low recent growth experience in those two countries was judged to be overly pessimistic. So the baseline scenario for these countries was raised to conform to their respective longer run growth experience. This does not affect the increment above this base path that is attributable to education, which is the focus of this paper.

[7] More specifically, the total effect elasticities are based originally on the effects of an increase of 2 percentage points in the percent of GNP invested in education (e.g. from 6.2% to 8.2% for the average OECD member country). This is converted to the effect of a **1 percent change** in EDSH (e.g. from 6.0 to 6.0 + 0.06, or to 6.06) by dividing the percent increase in the outcome by the percent increase in EDSH. The same procedure is followed for calculating the effects of a 1 percent increase in gross enrolment rates. That is, the increase in EDSH brings about a 6.5 percent increase in GER1, 23 percent in GER2 and 26.7 percent in GER3 by 2045, all calculated at the OECD means for each, which averages 25 percent, and then this is used as the denominator for calculating the approximate effect of a 1 percent increase in GER (1+2+3).

[8] Portugal simulations started from extraordinarily high 1995 secondary gross enrolment rates (see Table 2A in the Technical Appendix) but these seem to have been corrected in later World Bank (2000, p. 241) data that unfortunately give only net enrolment rates.

[9] The plotting of this one bar for AIR appears to be reversed on Figures 4 and 5.

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9

Trust, Associational Life and Economic Performance

Stephen Knack

> Conjoint action is possible just in proportion as human beings can rely on each other. There are countries in Europe, of first-rate industrial capabilities, where the most serious impediment to conducting business concerns on a large scale, is the rarity of persons who are supposed fit to be trusted with the receipt and expenditure of large sums of money.
>
> — John Stuart Mill, *Principles of Political Economy*, 1848

1. Why Trust Matters

From both historical and recent evidence, a theme repeatedly emerges in studies of development that the difference between long-term economic successes and failures is largely a function of incentives facing wealth-maximizing individuals.[1] In some countries, the structure of incentives steers people primarily toward producing new wealth, while in other countries, it is easier to gain wealth by diverting it from others. The relative payoffs of production and predation (or "making" vs. "taking") are determined by legal mechanisms for enforcing contracts and protecting property rights, but also by social norms and interpersonal trust. These governmental and social institutions, where they are effective, reduce uncertainty and transactions costs, enhancing the efficiency of exchange, encouraging specialization, and encouraging investment in ideas, human capital and physical capital. Where social and legal mechanisms for the efficient resolution of prisoners' dilemma and principal-agent games are weak or absent (i.e. where most potential pairs of economic transactors cannot trust each other) the private returns to predation increase while the private returns to production fall.

Trust potentially can influence economic performance through either of two major channels, "micro-economic" and "macro-political." At the micro level, social ties and interpersonal trust can reduce transactions costs, enforce contracts, and facilitate credit at the level of individual investors. At the macro level, social cohesion underlying trust may strengthen democratic governance (Almond and Verba 1963), improve the efficiency and honesty of public administration (Putnam 1993), and improve the quality of economic policies (Easterly and Levine 1997).

Douglass North (1990, p. 54) has argued that "the inability of societies to develop effective, low-cost enforcement of contracts is the most important source of both historical stagnation and contemporary underdevelopment in the Third World." Spot market transactions allow some gains from trade, but most of the potential benefits from specialization will be forgone in the absence of any trust-dependent trades (i.e. trades that occur over time or across space, and which are thus subject to opportunism on the part of one or both parties to the transaction). For example, goods and services may be provided in exchange for a promise of a future payment. Creditors loan money to debtors on the promise of future repayment. Managers hire employees to accomplish tasks that are difficult to monitor or measure. Investors rely on assurances by firms (and governments) that they will not expropriate these assets. Savers similarly rely on banks (and governments). According to Arrow (1972, p. 357), "Virtually every commercial transaction has within itself an element of trust, certainly any transaction conducted over a period of time. It can be plausibly argued that much of the economic backwardness in the world can be explained by the lack of mutual confidence."

Individuals in higher trust societies can spend less to protect themselves from being exploited in economic transactions. Written contracts are less likely to be needed, and they do not have to specify every possible contingency. Individuals in high-trust societies are also likely to divert fewer resources to protecting themselves - through tax payments, bribes or private security services and equipment - from unlawful (criminal) violations of their property rights. Low trust can also discourage innovation: if entrepreneurs must devote more time to monitoring possible malfeasance by partners, employees and suppliers, they have less time to devote to innovation in new products or processes. Zak and Knack (1998) develop a formal model in which these micro-level effects of trust influence rates of investment and growth.

Macro-level effects are more speculative, but the basic idea is that trust and the social cohesion that it reflects may improve economic outcomes indirectly, through political channels. It may improve governmental performance and the quality of economic policies by affecting the level and character of political participation. Knowledge of politics and public affairs by large numbers of citizens, coupled with their participation through voting and other modes of citizen voice, are important potential checks on the ability of politicians and bureaucrats to enrich themselves or narrow interests with which they are allied. But self-interested citizens will rationally decline to vote, to attend meetings or protest rallies, or even to acquire information about the performance of public officials. Where trust is higher, voters (principals) can more easily overcome the collective action problem in monitoring officials (agents). Putnam (1993) has shown that regional governments in the more trusting, more civic-minded northern and central parts of Italy provide public services more effectively than do those in the less trusting, less civic southern regions. Inglehart (1990, 1999) argues that a culture of trust is necessary for governments to be willing to surrender power to the opposition. He finds a strong correlation between trust and stability of democratic institutions, using cross-country data, but acknowledges the potential for reverse causation.

There is some empirical evidence that social cohesion and trust influence the quality of public policies. Easterly and Levine (1997) argue that ethnic divisions often are associated with more polarized preferences over public goods, impeding agreement over their provision, and with increased incentives for the group in power to create rents, through overvalued exchange rates and other means, to be rewarded to their own ethnic group at the expense of others. Using cross-country data, they find that ethnic heterogeneity is correlated with a range of indicators of inefficient policies, including a high black market currency premium, high corruption levels, low schooling rates, a lack of financial development and poor infrastructure. Using cross-city and cross-county data for the US, Alesina, Baqir, and Easterly (1999) find lower levels of public good provision in more ethnically divided areas.

Keefer and Knack (1995) show that property rights are more uncertain in highly polarized societies, as measured not only by ethnic tensions and heterogeneity but also by income and land inequality. Berg and Sachs (1988) tested the effects of income inequality on indebtedness, concluding that polarized countries are more likely to default on sovereign debt, as indicated by discounts on country debt in secondary markets.

La Porta et al. (1997) and Knack and Keefer (1997) showed that a survey-based measure of trust is associated with higher ratings on subjective measures of governmental efficiency, corruption and infrastructure quality.[2] Knack and Keefer also found that trust is significantly associated with measures of confidence in governmental institutions. While the trust measure used in these studies is a more direct measure of social cohesion than income equality or ethnic homogeneity, the potential for reverse causation increases. Cohesive and high-trust societies may be better at keeping their governments honest, but the honesty and efficiency of government officials can affect trust and social cohesion in turn. "If government leaders, judges and bureaucrats are corrupt, market participants can more easily justify and rationalize their own dishonest behavior" (Drobak 1998, p. 103; also see Gambetta 1988, pp. 158–163).

Assuming that J.S. Mill and others are correct in their belief that trust matters for the economic performance of nations, the determinants of trust become important. Section 2 discusses the sources of trust and briefly summarizes empirical evidence. Section 3 builds on Fukuyama's concept of the "radius of trust" to identify the type of trust which should be advantageous to national economic performance. Section 4 addresses measurement issues. Evidence on trust and economic performance relies heavily on the use of a single survey indicator of trust: in light of the potential for translation problems and other sources of measurement error, can this indicator be trusted? Section 5 presents empirical evidence on trust and economic performance, for a 25-nation OECD sample and for a larger 40-country sample. Section 6 presents evidence on the relationship between associational life and economic performance, testing the conflicting theoretical perspectives of Putnam (1993) and Olson (1982). Section 7 briefly concludes.

2. The Sources of Trust

Trust can be defined as the belief or perception by one party (e.g. a principal) that the other party (e.g. an agent) to a particular transaction will not cheat, where the payoff structure internal to the transaction can be characterized by a prisoner's dilemma or principal-agent game.[3] When trust is high, contracts (whether formal or informal) can be enforced without costly monitoring and investigation of performance by the contractual parties.

Trust can be produced in many ways. The various possible sources of trust can usefully be categorized as first-party, second-party or third-party enforcement mechanisms, although classifications are sometimes ambiguous.[4]

First-party mechanisms are those enforced on oneself by the agent, while second-party mechanisms are those controlled by the principal. With third-party mechanisms, sanctions are controlled by actors not party to the contractual agreement.

First-party enforcement mechanisms include ethical or moral codes that impose "internal sanctions," such as guilt, on cheaters. "Afterlife sanctions" associated with religious beliefs can also effectively raise the payoff to cooperating, increasing trust. A principal (even one who is not religious) will place greater trust in agents who believe cheating reduces the likelihood of going to heaven after death.[5] Altruism is another source of trust. Agents who care about the welfare of principals are less likely to cheat them. Knowledge that the agent's utility is positively related to the principal's payoff increases the principal's evaluation of the agent's trustworthiness.

Second-party mechanisms are those in which sanctions available to the principal increase the incentive of the agent to honour contractual agreements. For example, if the principal and agent in one transaction are also party to a second and contemporaneous agreement, but with the roles reversed, they have effectively exchanged hostages, and the incentives of each party, as agent, to cheat the other are reduced. More commonly, the anticipation of continued profitable dealings (repeated play of the game) will help restrain cheating by agents. In smaller or close-knit communities, the strong likelihood of social interaction between agents and principals can enhance trust in their contractual agreements, as cheating may prompt ostracism. If the agent values the principal's respect, shame is another potential cost of cheating, even (or especially) when the principal does not ostracize the cheating agent.[6]

Third-party enforcers that facilitate trust between the two parties to an agreement include social institutions, private organizations and governments. Cheating by agents may be deterred by the threat of social sanctions (such as shame and ostracism) exercised by third parties, or by the prospect that other principals will refuse to hire the agent in the future. John Stuart Mill (1848, pp. 135–136, 444) wrote that "...much of the security of person and property in modern nations is the effect of manners and opinion" and of "the fear of exposure" and reputational effects, rather than the product of laws and courts.

Most of these enforcement mechanisms are heavily dependent on kinship, ethnic or other social ties. Altruism tends to be stronger the closer the kinship ties between two people; there is likely even a genetic basis for this pattern. Ethical or religious beliefs, as well as some altruistic motivations, are the product of socialization processes. Second-party social sanctions are dependent on pre-existing and continuing social ties between the contractual parties. Third-party social sanctions are effective only when both parties are part of a dense social network.

These non-hierarchical sources of trust will be referred to collectively as "informal institutions." The strength of these informal institutions in a society is an inverse function of the average social distance between members of the society. Social distance can be measured along various dimensions, such as blood and ethnic ties; differences in language, culture, education, income, wealth, occupation, social status, or political and economic rights; or geographic distance. According to Zucker (1986, p. 63):

> Just as ethnicity, sex, or age may be used as an index of job skills by employers, they can be used as an index of trust in a transaction. They serve as indicators of membership in a common cultural system, of shared background expectations. In general, the

> greater the number of social similarities (dissimilarities), the more interactants assume that common background expectations do (do not) exist, hence trust can (cannot) be relied upon.

In general, the more homogeneous a society, the more trust a (randomly selected) principal will place in a (randomly selected) agent. Consistent with these arguments, Zak and Knack (1998) find that trust is more prevalent in societies with less income inequality and with less racial, linguistic and religious polarization.

Third-party enforcement mechanisms controlled by governments and non-governmental (but formal) organizations can be collectively termed "formal institutions." Most prominently among these, courts can enforce contracts.[7] Where legal codes and enforcement agencies are sufficiently developed, the prospect of legal sanctions reduces incentives to cheat, thereby enhancing trust that agreements will be faithfully executed by both parties. Other formal institutions include regulatory agencies (e.g. Securities and Exchange Commission), stock exchange memberships and professional associations, which restrain cheating by instituting financial disclosure rules or licensing requirements (e.g. certified public accountant, real estate licence), or by promulgating formal ethical codes (e.g. American Bar Association, American Medical Association). Credit bureaus protect lenders from opportunistic debtors, and protect sellers from buyers paying on credit.[8] Complaints on file with the Better Business Bureau are viewed as evidence of the untrustworthiness of firms. Other institutions increasing consumers' trust in producers are brand names, product endorsements by independent organizations (Good Housekeeping Seal of Approval, Underwriters' Laboratories, Consumers' Union) and product warranties.

The US provides an illustrative case study in which trust grounded in formal institutions, and in the ability to monitor agents, gradually replaced trust grounded in informal institutions between 1840 and 1920 (Zucker 1986). Informal institutions weakened in part because of increasing cultural heterogeneity of immigrants, and to a lesser degree because of increasing internal migration, which disrupted social ties. Average social distance increased. "In a heterogeneous social system, a proportionately smaller number of transactions occurred between similar others" (Zucker 1986, p. 78). More impersonal indicators of trust had to be used, for example letters of credit, and later credit ratings (Zucker 1986, p. 87). Requirements of financial soundness for listing on stock exchanges became more stringent; banks devoted more resources to investigating borrowers and increased collateral requirements (Zucker 1986, pp. 88–89). The ratio of managers to workers in manufacturing rose, as monitoring worker effort and output became a greater concern (Zucker 1986, pp. 91–92). The proportion of transactions occurring within hierarchies, as opposed to within markets, increased (Zucker 1986, p. 93).

Trust grounded in more formal institutions also grew in importance over time. Licensing standards (e.g. certification of accountants) emerged and professional associations were created (Zucker 1986, p. 94). Intermediary mechanisms, such as the use of escrow accounts, arose. Legislation (e.g. *Securities Act of 1933*) mandated disclosure of information to investors, and established regulatory agencies (e.g. the *Securities Exchange Act of 1934*, which created the Securities and Exchange Commission).

Knack and Keefer (1997) and Zak and Knack (1998) present cross-country evidence showing that governmental mechanisms for the effective enforcement of contracts and property rights are associated with higher trust. However, causality can easily go in both directions for such relationships (as noted at the end of section 1 above).

Several authors (e.g. Yamagishi and Yamagishi 1994) distinguish between two types of trust, one based on "deterrence" and another based on "benevolence." The former type roughly corresponds to trust produced by formal institutions as well as informal sanctions such as ostracism, while the latter type can be identified with altruism based on kinship or socialization. The very general phrasing of the standard survey question on trust from the US General Social Survey and the World Values Surveys (WVS) suggests that it will capture, at least in part, deterrence-based as well as benevolence-based trust. The question does not contain any qualifications implying that trust derived from the presence of effective legal sanctions is not really trust. However, it is likely that at least some respondents may interpret the question to apply only to interpersonal transactions beyond the reach of the law.

Trust can facilitate mutually beneficial collective action and reduce transactions costs regardless of whether it is generated by effective deterrence or by benevolence. One might be tempted to try to isolate the effects on economic outcomes of trust that are not based on legal deterrence by including measures of governmental efficiency as control variables. In growth regressions, adding such controls slightly reduces the estimated effect of trust, but trust remains significant (Zak and Knack 1998). However, any attempt to make distinctions empirically between different sources of trust in this way is somewhat arbitrary. Trust based on benevolence or on the deterrent effect of informal sanctions are both dependent on social ties and interaction. If Putnam and others are correct regarding social determinants of governmental efficiency, legal systems will be more effective in creating trust in societies where social ties and social norms have already created more trust, based on benevolence or informal sanctions.

3. The Radius of Trust and Cooperation

In studying the relationship between trust and economic welfare, the choice of units of analysis is crucial. Cooperation that is generated by trust can produce costs as well as benefits. Collective action by members of a group often imposes costs on non-members (Olson 1982). Cooperation within a particular group can generally be expected to enhance the welfare of members of that group, in the sense that the collective gains net of costs to group members is positive. However, the welfare of non-members may also be affected – sometimes for the better but sometimes for the worse.

Occasionally the **goal** of one group is to reduce the well-being of members of some other group. In such instance, we can hypothesize that successful collective action in the first group (e.g. the Nazi Party in 1930's Germany) will entail welfare losses for members of the second group (the Jewish population). More often – as in the case of sugar producers and consumers in the US – the first group may not directly value a reduction in the welfare of non-members, but may nonetheless be willing to impose substantial costs on non-members in the pursuit of group goals.

The implication is that without specifying what Fukuyama (1999) calls the "radius" of trust, and the population for which economic welfare is to be measured, we cannot hypothesize that trust improves economic welfare. When the radius of trust does not coincide with the population for which welfare is to be measured, trust has at best ambiguous effects.

For example, if the members of each household in a particular village cooperate in the interests of the household, the village as a whole may be worse off than a neighbouring village in which households are less willing or able to impose costs on persons outside the household.

As a second example, suppose that trust and cooperation generated by strong social ties within a village raise the rate of return to a public project, making all residents of the village better off. If these same social ties were responsible for the village's success in lobbying for outside funds to finance the project, a second village with weaker social ties losing out in the competition for funds is made worse off. If the funds would have been more productively spent in the second village (e.g. suppose it is much poorer), high intra-village trust in the first village can actually reduce social welfare at the aggregate level.

In perhaps the most relevant example, strong ethnic ties can improve the welfare of members of an ethnic group,[9] but often at the expense of other groups. Depending on how "encompassing" a group is, the costs it is willing to impose on non-members in the pursuit of its members' interests may be an enormous multiple of the group's gains from collective action (Olson 1982).

Table 1 summarizes how few of the possible hypotheses concerning the impact of trust on economic performance can be signed unambiguously. The various rows of the table represent the population whose welfare is at issue, while the various columns represent the radius of trust. Where the two coincide - only on the main diagonal elements in the matrix - we can predict that trust improves economic performance, so hypotheses can be positively signed. All of the other elements in the matrix are represented by question marks, indicating that collective action generated by trust has ambiguous effects on welfare.

Table 1

Possible hypotheses re: impact of trust on economic performance

	Trust and cooperation among members of...						
Welfare of:	Household 1	Household 2	Village 1	Village 2	Ethnic group 1	Ethnic group 2	Nation
Household 1	+	?	?	?	?	?	?
Household 2	?	+	?	?	?	?	?
Village 1	?	?	+	?	?	?	?
Village 2	?	?	?	+	?	?	?
Ethnic group 1	?	?	?	?	+	?	?
Ethnic group 2	?	?	?	?	?	+	?
Nation	?	?	?	?	?	?	+

Identifying Olson (1982) and Putnam (1993), not without some exaggeration, with either end of a continuum of views concerning the effects of collective action by groups, an extreme Olsonian perspective would suggest that the cells of Table 1 not on the main diagonal in general should be negatively signed. The Putnam perspective calls for positive signs, as cooperation among members of a group is believed to create habits and attitudes toward serving the greater good that carry over to members' interactions with non-members. Which effect is larger is an empirical question, with answers that likely vary with culture and institutions. For example, religions may differ in their emphasis on the desirability of behaving altruistically toward strangers. Where civil liberties and property rights are secure under a strong rule of law, fewer social resources are up for political grabs and groups have less opportunity to benefit via zero-sum or negative-sum competition against other groups.

A rapidly growing literature tests household- and village-level hypotheses concerning the impact of social ties on economic welfare (e.g. Grootaert 1999, Narayan and Pritchett 1999). This study focusses on tests of the hypothesis located in the lower-right corner of Table 1, that a wide radius of trust and propensity to cooperate has favourable implications for economic performance measured at the national level. This choice does not reflect any belief that macro-level analyses of trust are "better" or more interesting in any sense than micro-level analyses, but rather the belief that there are interesting macro-level (as well as micro-level) hypotheses regarding the impact of trust, and macro-level hypotheses can only be appropriately tested using macro-level data for macro units of analysis. Nation-states are the natural unit of analysis in studies of economic performance, because economic policies are determined by national governments. Even with increasing "globalization," national borders still matter for the location decisions of labour and capital, and for the density of transactions across firms (Helliwell 1998).

The limited availability of appropriate data seriously constrains cross-country analyses. To include the majority of countries at present, it would be necessary to use very crude proxies for trust (e.g. ethnic homogeneity, income inequality or religious composition) which could easily be related to economic performance through entirely unrelated channels. More direct measures will, therefore, be used here, at the expense of a large reduction in sample size.

Cooperative norms, trust and social ties are most readily measured through conducting surveys of individuals or households. Important issues arise in aggregating survey-based measures to assign values to **nations**. For example, a country populated by individuals with strong intra-family or intra-ethnic trust or ties is not what Fukuyama (1995) and others mean by "high-trust societies."

Conceptually, the type of trust that should be unambiguously beneficial to a nation's economic performance is trust between strangers, or more precisely between two randomly selected residents of a country. Particularly in large and mobile societies where personal knowledge and reputation effects are limited, a sizeable proportion of potentially mutually beneficial transactions will involve parties with no prior personal ties. In societies where strangers can trust each other to act in the collective interest, people not only can leave their bicycles unattended and unlocked on the street, they can contract with a wide range of parties without extended written agreements, and run a business without devoting substantial time to monitoring employees, partners and suppliers. A resident of a high-trust society may also be more likely than a member of a low-trust society to support efficient economic policies, whether or not those policies increase one's personal income.

Thus, it is something like trust in strangers, or the propensity to cooperate in large-numbers prisoners' dilemma settings, that must be measured to test the hypothesis represented in the bottom right corner of Table 1. Within-family trust, intra-ethnic trust, or other forms of limited-radius trust may well be corrosive to wider-radius trust (i.e. trust in strangers). Strong intra-ethnic trust in an ethnically heterogeneous society may restrict the scope for transacting and lead to segmented markets, reducing gains from specialization and from economies of scale (Greif 1994).

4. Measuring Trust – Can the Indicator Be Trusted?

In a critique of Fukuyama (1995), Solow (1995) argues that systematic tests of the economic impact of trust are needed, but are precluded by lack of data, as "measurement seems very far away." Subsequent cross-country analyses (Knack and Keefer 1997, LaPorta et al. 1997, Zak and Knack 1998) have relied heavily on survey-based indicators that are doubtless highly imperfect, due to translation difficulties, sampling error and response bias, but which nevertheless produce values that are consistent with information from independent sources.

Zak and Knack (1998) analyse the impact of trust on economic performance using trust data for 40 market economies from the WVS. The number of respondents in these surveys ranges from several hundred to several thousand. Some groups (e.g. city-dwellers and the better educated) are oversampled in some countries (Inglehart 1994). The weight variable provided in the data can partially correct for this problem, but higher status groups still tend to be overrepresented, particularly in the less developed countries, even with use of the weight variable (Inglehart 1994). This problem should have the effect of attenuating the variation in country-level measures of trust - which tend to be positively correlated with income and education levels - making it more difficult to reject the null hypothesis that trust has no effect.

The question used to assess the level of trust in a society is: "Generally speaking, would you say that most people can be trusted, or that you can't be too careful in dealing with people?" The standard trust indicator (TRUST) is the percentage of respondents in each nation replying that "most people can be trusted" (after deleting the "don't know" responses). Several survey waves have been conducted, in 1981, 1990-91 and 1995-96. To minimize the potential for reverse causality, Zak and Knack use the earliest available observation for each country. The mean value for TRUST in their 40-nation sample is 32.3 percent, with a standard deviation of 15.1 percent.

This trust item is somewhat ambiguous with respect to which "people" respondents have in mind. It is surely measuring something more broad than intra-family or intra-clan trust.[10] Responses, however, are likely to be influenced by the frequency of encounters with strangers.

In low-trust environments, a higher proportion of transactions will occur between close friends and relatives and a lower proportion between strangers, relative to high-trust environments. When asked if "most people" can be trusted, some respondents conceivably take into account in their replies only those people they transact with or are likely to transact with; in low-trust environments, therefore, this survey indicator may not be a good measure of high-radius trust (trust in strangers). Note that one implication of this sort of measurement error is that cross-country variation in the trust measure will be reduced, making it more difficult to reject null hypotheses regarding the effects (or determinants) of trust.

Assessments of whether or not "most people" can be trusted are likely to reflect in part interactions with foreigners for respondents in small nations such as Luxembourg, in contrast to large nations such as the US. However, the measured economic performance of Luxembourg is influenced more heavily by any transactions occurring with foreigners. Therefore, this effect of country size on trust responses should not be an important source of measurement error.

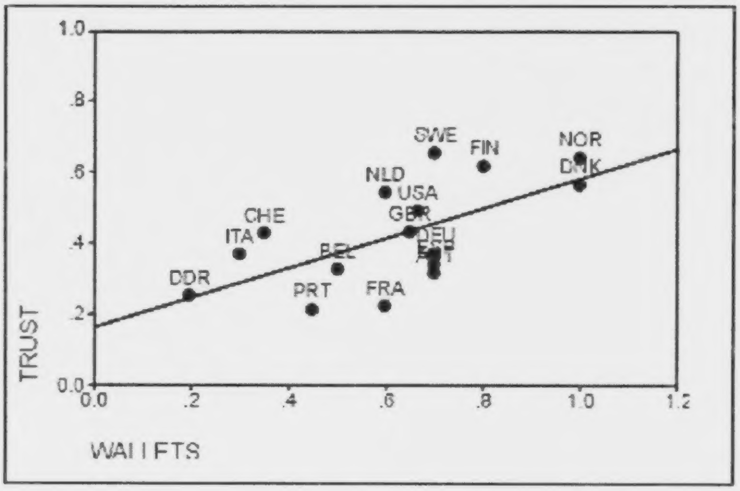
Despite the range of potential problems, there is substantial reason to believe that the survey-based trust indicator is in fact a reasonably good measure of high-radius trust that is not overly sensitive to translation difficulties, non-random samples of respondents or other sources of measurement error. First, most country values appear to be consistent with popular impressions and anecdotal evidence: for example, the highest values are observed for the Nordic nations, where citizens commonly leave unlocked bicycles and unattended strollers in public areas.[11] Second, there is extremely wide cross-country variation in the percentage of high-trust respondents, with several countries at 10 percent or below. These low values suggest that few respondents interpret "most people" in a highly circumscribed way. Third, data from experiments conducted by the *Reader's Digest* (as reported in *The Economist*, June 22, 1996) provide reassuring behavioural evidence for the validity of these survey measures. Fourth, the trust measure is strongly associated with attitudinal measures of how trust**worthy** people are toward strangers. Finally, evaluations by foreigners in surveys are generally consistent with the assessments of a nation's own residents.

In the *Reader's Digest* experiment, 20 wallets containing $50 worth of cash and the addresses and phone numbers of their putative owners were "accidentally" dropped in each of 20 cities, selected from 14 different western European countries. Ten wallets were similarly "lost" in each of 12 US cities. The number of wallets returned with their contents intact was recorded for each city. Country-level proportions of the number of returned wallets were then calculated. Figure 1 depicts the relationship at the country level between returned wallets and the

WVS trust indicator. The proportion of wallets returned is correlated with TRUST at 0.65. This correlation cannot be explained away by attributing high-trust attitudes and wallet-returning behaviour to higher per capita incomes: the partial correlation between TRUST and returned wallets, controlling for per capita income, is even higher than the simple correlation.

Figure 1

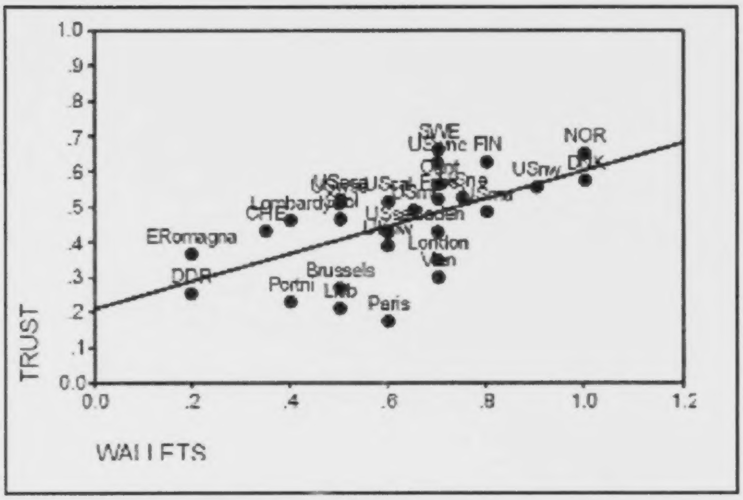
Trust and returned wallets (nations)



For many countries in the WVS, regional aggregates as well as national aggregates can be constructed for TRUST. For example, nine regions in the US are identified. The cities in the wallets experiment can then be matched with these regional values for TRUST. Figure 2 depicts the cross-regional relationship between returned wallets and TRUST; for countries in the WVS for which respondents' regions are not identified, Figure 2 includes the country-level observations contained in Figure 1. By matching cities in the wallets experiment only with survey respondents from the region in which the city is located, greater precision can be attained in Figure 2 than in Figure 1. However, the WVS surveys are designed to be representative only at the national level, not the regional level, so using regional observations adds one source of measurement error even as it reduces another source. Neither the country-level nor regional-level test is necessarily superior to the other, therefore, but they are both useful for validating TRUST because

Figure 2

Trust and returned wallets (regions)



they contain different information. The regional-level association between returned wallets and TRUST turns out to be nearly as strong as the country-level association.

The wallets experiment evidence indicates that non-random samples, translation problems and discrepancies between professed attitudes and actual behaviours do not introduce severe noise in the survey-based measure of trust. It is also consistent with the belief that TRUST measures wide-radius trust, because the "lost" wallets in the experiments are found by strangers.

Trust in strangers could not be sustained for long in an environment where trust**worthy** behaviour toward strangers is absent. At the aggregate level, trust should be correlated with trustworthiness.[12] The wallets experiment is reassuring in this respect. Additional evidence is available from a series of WVS items on respondents' attitudes toward taking advantage of strangers in various contexts (e.g. cheating on taxes or subway fares, or not reporting damage to a parked vehicle). Cooperative attitudes on these survey items are strongly correlated with TRUST across countries, even when controlling for per capita income (Knack and Keefer 1997).

Foreigners' perceptions of the trustworthiness of a nation's residents are correlated with TRUST (i.e. with levels of trust among a nation's own citizens). In 1980, Eurobarometer conducted surveys in 10 European Community nations, and included the following question:

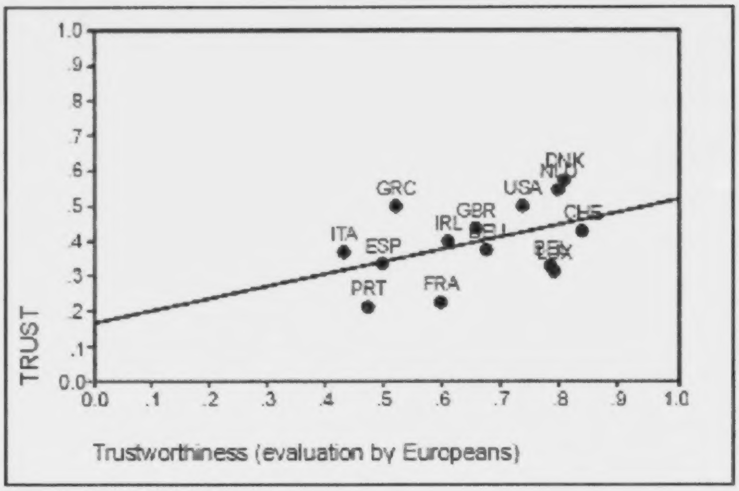
> Now I would like to ask about how much you would trust people from different countries. For each country please say whether, in your opinion, they are in general very trustworthy, fairly trustworthy, not particularly trustworthy, or not at all trustworthy.

The survey inquired about Americans and about 13 European nationalities. Responses are likely to reflect first-hand experiences with the nationals of another country, second-hand accounts from one's own countrypersons about their experiences with nationals of the other country, and information concerning how nationals of the other country behave with respect to each other (e.g. crime rates, impressions about social norms and mores).[13] Because a willingness to cheat foreigners does not necessarily indicate how a country's nationals interact with each other, these external perceptions do not provide an ideal validation test for TRUST. However, unlike TRUST, external assessments are not potentially sensitive to translation problems (assessments are provided by respondents in 9 or 10 nations, with surveys administered in numerous languages), or to "cultural" differences in the way people respond to survey questions, or to the possibility that "most people" means something different to respondents in low-trust and high-trust societies.

Figure 3 depicts the relationship between TRUST and the measure

Figure 3

External perceptions of trustworthiness



of how trustworthy foreigners perceive a country's nationals to be. There is a positive correlation (0.45, $p = 0.056$ for 1-tailed test), although not as strong or statistically significant as the correlations of TRUST with returned wallets and trustworthy attitudes.

These correlations with external assessments, trustworthy attitudes and trustworthy behaviour (in the form of returned wallets) collectively provide substantial evidence for the validity of the standard survey measure of trust. Each of these validity tests is less than ideal: the returned wallets proportions are based on a sample of only 10 dropped wallets in some countries; the prevalence of trustworthy attitudes in a country does not necessarily reflect trustworthy behaviour; and external assessments to a large degree likely reflect expectations regarding how foreigners expect to be treated by nationals of a given country, which may or may not be strongly correlated with the way nationals of that country behave with respect to each other. However, the potential sources of "measurement error" in each of these variables – returned wallets, trustworthy attitudes and external assessments – are independent of each other and are independent of the potential sources of error in TRUST. The fact that they are each strongly correlated with TRUST suggests that the latter variable is a useful measure of wide-radius trust that is not a hopelessly noisy product of imperfect translations, non-random samples, cultural differences in the way people respond to survey questions, or differences in the way respondents interpret the ambiguous phrase "most people."

Using this survey-based measure of trust, the following section reproduces from Zak and Knack (1998) cross-country empirical findings on the relationship between trust and economic performance, and replicates some of those tests for a restricted, OECD-only sample. Because data on TRUST are available for many more countries (40 market economies) than data on returned wallets, external assessments and trustworthy attitudes, those latter variables are not used below.[14]

5. Empirical Evidence on Trust and Economic Performance

Fukuyama (1995) attributes cross-national differences in economic performance to variations in trust and "spontaneous sociability." He emphasizes the implications of the radius of trust for industrial organizations: where trust does not extend beyond the family, the supply of capital and of qualified managers is more limited, constraining the scale of private firms. More generally, he argues that higher trust societies are better able to implement efficient organizational innovations when changes in technology or other factors make existing organizational forms obsolete. Trust can influence economic outcomes through macropolitical channels as well, because "sociability is also a vital support for

Table 2

Summary statistics – "World" sample and OECD sample

Variable	Sample	Coefficient of variation	Mean	Standard deviation	Minimum	Maximum
Trust	World	.47	32.3	15.1	5.0	61.2
	OECD	.34	39.1	13.2	10.0	61.2
Growth, 1970–92	World	.83	1.91	1.59	-1.22	6.96
	OECD	.49	2.39	1.18	0.93	6.96
Investment/ GDP, 1970–92	World	.31	21.7	6.7	3.0	35.7
	OECD	.16	25.4	4.2	16.8	35.7
GDP per capita, 1970	World	.62	5850	3613	767	12 963
	OECD	.39	7731	3029	1680	12 963
School attainment, 1970	World	.47	5.31	2.48	0.74	10.22
	OECD	.35	6.43	2.28	1.21	10.22
Price of investment goods, 1970	World	.24	80.1	19.5	46.2	136.4
	OECD	.21	80.0	16.7	46.2	120.2
Group memberships	World	.45	.77	.35	.38	1.70
	OECD	.46	.80	.37	.38	1.70
Putnam memberships	World	.55	.32	.18	.06	.83
	OECD	.58	.32	.18	.06	.83
Olson memberships	World	.59	.30	.18	.12	.76
	OECD	.56	.33	.18	.12	.76

self-governing political institutions" (p. 325), as in Putnam (1993).

Fukuyama's empirical evidence is mostly descriptive and qualitative rather than quantitative. Among the nations he discussed in detail, he classified the US, Japan and Germany as high-trust societies, and France, Italy, China, Korea, Hong Kong and Taiwan as low-trust societies, based on impressionistic evidence.

La Porta et al. (1997) and Knack and Keefer (1997) used the WVS trust measure to conduct more systematic tests of Putnam's and Fukuyama's hypotheses. La Porta et al. found that trust is positively associated with growth (significant at 0.10) over the 1970 to 1993 period, controlling only for initial per capita income. They also tested

Fukuyama's firm scale hypothesis, regressing the revenues of the 20 largest firms as a proportion of gross domestic product (GDP) on per capita income, TRUST and a measure of trust in family members. Providing striking support for Fukuyama, the scale measure is unrelated to income, and strongly related to the two trust measures: positively for TRUST, and negatively for trust in family. La Porta et al. also found that higher trust societies have lower infant mortality, controlling for income, a result also obtained for the American states by Kawachi et al. (1997).

For the 29 market economies included in the 1980-81 and 1990 waves of the WVS, Knack and Keefer add TRUST to Barro-type investment and growth regressions for the 1980 to 1992 period, finding positive and significant relationships. Results for growth, but not for investment, are weaker when longer periods (1970–1992 or 1960–1992) are used. Results are also somewhat sensitive to outliers, as might be expected in such a small sample. Deleting Korea and Brazil reduces the TRUST coefficient by half in the growth regression, although it remains highly significant. Deleting Korea from the investment regression makes TRUST insignificant. Results are also somewhat sensitive to the measures of human capital included in the regressions: TRUST coefficients are lower using the Barro-Lee (1993) attainment measures than using enrolment measures, or attainment measures from other sources.

Zak and Knack (1998) present a general equilibrium growth model in which investors of varying types are randomly matched each period with brokers of varying types, where trust declines with difference in type. Low trust is predicted to reduce investment and growth. Their empirical tests add 11 countries to the 29-nation sample used by Knack and Keefer (1997), using data on TRUST for nine countries provided by Ronald Inglehart from the third wave of WVS (conducted in 1995-96) and for two more countries (Greece and Luxembourg) from Eurobarometer surveys conducted in the 1980s. Results are strengthened using this larger sample: TRUST is significantly related to growth over longer periods such as 1970 to 1992, as well as for 1980 to 1992, and the estimated impact of TRUST on growth is much less sensitive to outliers or to the choice of human capital variables than in Knack and Keefer (1997).

Eqs. 1 to 5 in Table 3 reproduce regression results from Zak and Knack (1998). The dependent variable is average annual growth in per capita income for 1970 to 1992 (1980–1992 in Eq. 3), as constructed from Summers and Heston (1991) data. Other than TRUST, regressors include 1970 per capita income, schooling attainment for 1970 (mean years for the population aged 25 or over) from Barro and Lee (1993), and the price of investment goods for 1970, as a percentage of US prices (from Summers and Heston 1991).

Table 3

Trust and growth

Equation	1	2	3	4	5	6
Period	1970-92	1970-92	1980-92	1970-92	1970-92	1970-92
Sample	World	World	World	World	World	OECD
Method	OLS	OLS	OLS	2SLS	OLS	OLS
Constant	4.034 (0.886)	1.097 (0.812)	1.955 (0.806)	4.035 (0.927)	4.218 (0.965)	3.751 (0.886)
GDP per capita (000s)	-0.083 (0.108)	-0.194 (0.107)	-0.005 (0.153)	-0.082 (0.099)	-0.085 (0.093)	-0.354* (0.127)
Schooling attainment	-0.049 (0.149)	-0.096 (0.115)	-0.194 (0.234)	-0.048 (0.170)	0.015 (0.140)	0.062 (0.114)
Price of investment goods	-0.043* (0.010)	-0.024* (0.009)	-0.018* (0.007)	-0.043* (0.011)	-0.042* (0.011)	0.009 (0.008)
Trust	0.064* (0.022)	0.046* (0.019)	0.088* (0.028)	0.064* (0.026)	0.057* (0.019)	0.006 (0.016)
Investment/ GDP		0.136* (0.033)				
Trust*GDP					-0.010* (0.004)	
R^2	.42	.57	.29	.37	.50	.53
SEE	1.27	1.11	1.87	1.27	1.20	0.88
Mean, D.V.	1.91	1.91	1.30	1.91	1.91	2.39

N = 40 in Eqs. 1-5 and N = 25 in Eq. 6. A * indicates significance at 0.05 level for 2-tailed test. R^2 does not have its usual interpretation in 2SLS (Eq. 4). Instruments in 2SLS include percent Muslim and percent Catholic; p-value in test of overidentifying restrictions is 0.27.

Eq. 1 demonstrates the positive relationship between trust and growth. In the 40-nation sample, the effects of initial income and schooling are weaker than in larger samples (e.g. compare to Barro 1991). Higher investment goods prices, relative to US levels, are significantly and negatively associated with growth, as expected. Controlling for these influences, growth rises by nearly 1 percentage point on average for each 15-percentage point rise (one standard deviation) in TRUST.

Controlling for investment rates in the growth regression in Eq. 2, the trust coefficient falls by more than one-fourth but remains significant.[15] This finding has two plausible explanations: first, that some components of investment broadly defined – including investments in ideas – may not show up in the investment data and, second, that trust may influence growth through other channels as well as through investment. For example, high trust levels may reflect social cohesion conducive to the implementation of efficient economic policies.

Half of the trust observations are from surveys conducted midway through the 1970 to 1992 period (the 1980-81 wave), with the remainder from surveys conducted even later, raising the possibility of reverse causation from growth to trust. The extremely high (0.91) correlation of trust values from the first survey wave to the second wave suggests that trust variations over time are very small relative to variation across countries. Nevertheless, the Eq. 1 regression was replicated for the 1980 to 1992 period, which is somewhat less subject to reverse causation than the 1970 to 1992 period. The coefficient of trust is higher for the 1980 to 1992 regression, as shown in Eq. 3, than it is for the longer period in Eq. 1, suggesting that simultaneity bias is not driving our results. Eq. 4 reports results from a more formal correction for the possible endogeneity of TRUST, two-stage least squares regressions which use as exogenous instruments for TRUST the Catholic and the Muslim shares of each country's population.[16] The exogenous component of trust is significantly and positively associated with growth, as shown in Eq. 4.[17]

The negative (but insignificant) coefficient on initial per capita income in Eq. 1 indicates that other things equal, poorer countries grow faster, on average, than richer ones. Relative backwardness does not necessarily help every poor country, however. Attracting and successfully adapting foreign capital and technology may be facilitated by trust between economic agents; backwardness would then provide a larger advantage for a high-trust poor nation than for a low-trust poor nation. This hypothesis implies a negative coefficient on the interaction term TRUST × GDP per capita.[18] This prediction is borne out in Eq. 5. For nations with trust levels 10 percentage points above the mean, the coefficient on initial income more than doubles and attains statistical significance. For countries 10 points below the mean on trust, the coefficient drops to zero, and backwardness yields no growth advantage over rich nations.

Eq. 1 of Table 4 replicates a regression from Zak and Knack (1998) linking TRUST to rates of investment as a share of GDP. Investment is not significantly related to schooling in Eq. 1; it is higher where per capita incomes are higher, where investment goods prices are relatively low, and where trust is higher. The investment/GDP share rises by nearly one percentage point for each seven-percentage point increase in TRUST. Eq. 2 reports results using two-stage least squares, with percent Catholic and percent Muslim as instruments. The TRUST coefficient increases slightly, but is not significant at conventional levels.

There is apparently only one study that has examined the relation-

Table 4

Trust and investment (1970–92)

Equation	1	2	3	4
Sample	World	World	OECD	OECD
Method	OLS	2SLS	OLS	2SLS
Constant	21.655 (3.115)	21.585 (3.450)	24.939 (2.536)	24.939 (2.536)
GDP per capita (000s)	0.826* (0.261)	0.821* (0.370)	0.237 (0.298)	0.308 (0.486)
Schooling attainment	0.349 (0.598)	0.295 (0.632)	-0.184 (0.464)	-0.508 (0.813)
Price of investment goods	-0.137* (0.028)	-0.138* (0.042)	-0.071 (0.051)	-0.086 (0.077)
Trust	0.135* (0.058)	0.149 (0.097)	0.141 (0.072)	0.220 (0.138)
R^2	.55	.55	.13	.15
SEE	4.7	4.7	4.3	4.3
N	40	40	25	25
Mean, D.V.	21.7	21.7	25.4	25.4

White-corrected standard errors are shown in parentheses. A * indicates significance at 0.05 for 2-tailed tests. R^2 does not have its usual interpretation in 2SLS. Instruments in 2SLS include percent Muslim and percent Catholic; p-value in test of over-identifying restrictions is 0.06 in Eq. 2 and 0.83 in Eq. 4.

ship between TRUST and economic performance in an OECD sample. Helliwell (1996) found that TRUST was **negatively** and significantly related to productivity growth for a sample of 17 OECD members. In examining productivity growth only, Helliwell did not explore the possibility that trust influences income growth through factor accumulation channels.

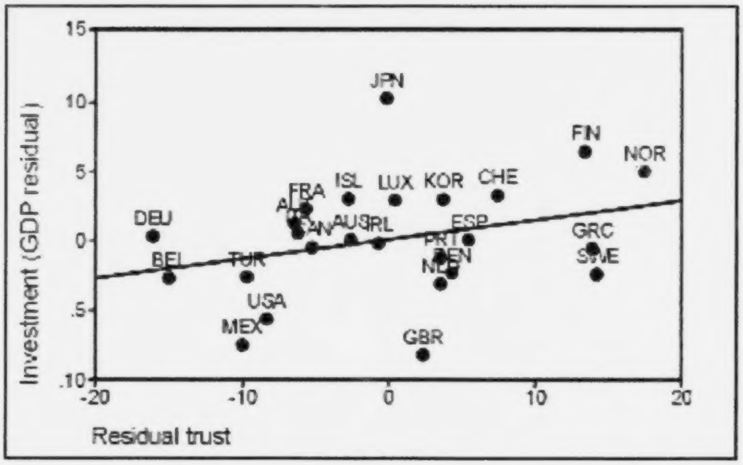
An OECD-only test is more demanding than tests employing the larger sample, because there is substantially less variation in the dependent variables and in TRUST. The coefficient of variation (CV) for TRUST is 0.47 in the larger sample, and 0.34 in the OECD. The CV for growth declines from 0.83 to 0.49, and the CV for investment/GDP drops from 0.31 to 0.16.

Eq. 6 of the growth table, Table 3, replicates Eq. 1 for OECD nations only, reducing the sample from 40 to 25. In this sample, per capita incomes exhibit strong convergence. The other notable difference from Eq. 1 is that the TRUST coefficient is not significantly related to income growth. Of course, it is impossible to know whether restricting the sample produces more accurate estimates by separating dissimilar countries with dissimilar growth processes, or produces less accurate estimates by discarding useful information. The TRUST coefficients of 0.064 in Eq. 1 and 0.006 in Eq. 6 present two alternative answers to the question of whether increasing trust would improve economic performance in an OECD nation. The interaction result from Eq. 5 offers a third possible answer: one way to interpret this interaction coefficient is that the marginal impact of a 1-point rise in TRUST drops from 0.057 to 0.047, 0.037, etc., as 1970 per capita income levels increase by $1,000, $2,000, etc. from the sample mean of $5,850. The marginal impact rises similarly for nations with below-average incomes. These estimates imply that trust matters for growth for several of the poorer OECD nations, particularly Turkey (with a Summers-Heston per capita income of $3,741 in 1990) and Mexico ($5,827 in 1990).

For investment, estimates for OECD nations are less problematic. First, the effects of TRUST on investment do not vary significantly with per capita income levels. Second, estimates of TRUST's effects on investment are very similar for the larger sample of countries and for the OECD sample. Eq. 3 in Table 4 replicates Eq. 1, but deletes 15 non-OECD nations. The TRUST coefficient changes only slightly, and despite an increase in the standard error, it is significant at the 0.06 level for 2-tailed tests (0.03 for 1-tailed tests). Figure 4 depicts the partial relationship between investment and TRUST in this OECD sample, controlling for initial income, education and investment goods prices. Eq. 4 replicates the 2SLS test of Eq. 2 for the OECD sample.

Figure 4

Investment and trust (partial plot), OECD



The TRUST coefficient in Eq. 4 is larger than in Eq. 2, although neither one of them is significant at conventional levels.

6. Empirical Evidence on Group Memberships and Economic Performance

Two classic works in social science sharply conflict in their perspectives on whether private associations tend to generate positive or negative externalities on non-members. Putnam (1993) viewed memberships in horizontal associations as a source of trust and social ties conducive to governmental efficiency and economic performance. He attributed the successes of northern Italy, relative to the south, in large part to its richer associational life, asserting that groups "instill in their members habits of cooperation, solidarity, and public-spiritedness" (Putnam 1993, pp. 89-90). Olson's (1982) view of associations was much less favourable, emphasizing their propensity to act as special interest groups lobbying for preferential policies that impose disproportionate costs on the rest of society.[19]

Knack and Keefer (1997) tested these alternative theories using WVS data on group memberships, available for 26 market economies. Tables 5 and 6 present the results of tests very similar to those in Knack and Keefer (1997).

Respondents in the WVS were asked whether they belonged to any of the following types of organizations:

a) social welfare services for elderly, handicapped or deprived people
b) religious or church organizations
c) education, arts, music or cultural activities
d) trade unions
e) political parties or groups
f) local community action on issues like poverty, employment, housing, racial equality
g) third world development or human rights
h) conservation, the environment, ecology
i) professional associations
j) youth work (e.g. scouts, guides, youth clubs)

The overall measure of the density of associational activity ("group memberships") is the average number of groups cited per respondent in each country. This indicator unfortunately does not measure the intensity of participation in groups. Assuming that group memberships are correlated with levels of activity, this measure constitutes a reasonable approximation of Putnam's notion of the density of horizontal networks in a society.[20] Independent data on union memberships as a proportion of the labour force for the late 1970s are available from Wallerstein (1989) for 18 of the 26 countries with WVS data on group memberships (for the late 1970s), permitting a check on the reli-

Table 5

Group memberships and economic performance

Equation	**1**	**2**	**3**	**4**	**5**	**6**
Dependent variable	Growth 1970–92			Investment/GDP 1970–92		
Method	OLS	OLS	2SLS	OLS	OLS	2SLS
Constant	5.509 (1.618)	5.836 (1.776)	4.131 (2.885)	25.857 (3.268)	27.343 (3.520)	23.071 (8.554)
GDP per capita (000s)	-0.136 (0.158)	-0.152 (0.149)	-0.329 (0.305)	0.471 (0.292)	0.198 (0.341)	-0.335 (0.905)
Schooling attainment	0.083 (0.176)	0.065 (0.177)	0.495 (0.506)	0.637 (0.468)	0.750 (0.525)	1.935 (1.499)
Price of investment goods	-0.044 (0.025)	-0.049 (0.027)	0.012 (0.061)	-0.080 (0.059)	-0.094 (0.063)	0.067 (0.181)
Group memberships	0.898 (0.807)			-3.086 (4.606)		
Putnam memberships		0.593 (1.519)	-10.613 (10.109)		-10.861* (4.971)	-42.866 (29.970)
Olson memberships		2.615 (1.519)	-1.139 (4.577)		6.760 (6.412)	-1.140 (13.570)
R^2	.28	.32	.14	.23	.35	.19
SEE	1.31	1.30	2.41	4.6	4.3	7.1
Mean, D.V.	2.11	2.11	2.11	24.4	24.4	24.4

N = 26. White-corrected standard errors are shown in parentheses. A * indicates significance at 0.05 for 2-tailed tests. Note R^2 does not have its usual interpretation in 2SLS. Instruments in 2SLS include percent Muslim, percent Catholic and percent Protestant; p-value in test of over-identifying restrictions is 0.39 in Eq. 3 and 0.25 in Eq. 6.

ability of the survey data. The cross-country correlation of this variable with item d on trade union memberships is a reassuring 0.68.

Eqs. 1 and 4 in Table 5 show that group memberships are not related to (respectively) growth or investment. A possible explanation for this result is that the harmful effects of groups as rent-seeking organizations theorized by Olson (1982) are roughly offset by the positive effects posited by Putnam (1993).

To further explore this possibility, memberships in "Olson groups" are differentiated from memberships in "Putnam groups." Groups b, c

Table 6

Group memberships and economic performance in the OECD

Equation	1	2	3	4	5	6
Dependent variable	Growth 1970-92			Investment/GDP 1970-92		
Method	OLS	OLS	2SLS	OLS	OLS	2SLS
Constant	4.293 (0.911)	4.265 (0.842)	2.473 (2.385)	23.232 (3.651)	24.935 (2.718)	16.627 (11.547)
GDP per capita (000s)	-0.455* (0.135)	-0.452* (0.133)	-0.604* (0.221)	-0.181 (0.425)	-0.319 (0.407)	-1.027 (1.069)
Schooling attainment	0.130 (0.118)	0.124 (0.114)	0.389 (0.319)	0.787 (0.513)	0.923 (0.529)	2.161 (1.544)
Price of investment goods	0.013 (0.008)	0.013 (0.008)	0.063 (0.052)	0.040 (0.071)	0.009 (0.060)	0.239 (0.254)
Group memberships	-0.252 (0.345)			-6.026 (4.293)		
Putnam memberships		0.099 (0.738)	-6.442 (5.976)		-13.417* (4.629)	-44.088 (28.935)
Olson memberships		-0.602 (0.592)	-2.892 (3.201)		1.557 (6.326)	-8.873 (15.499)
R^2	.67	.68	.43	.16	.28	.14
SEE	0.80	0.82	1.45	4.4	4.2	7.0
Mean, D.V.	2.39	2.39	2.39	25.6	25.6	25.6

N = 22. White-corrected standard errors are shown in parentheses. A * indicates significance at 0.05 for 2-tailed tests. Note R^2 does not have its usual interpretation in 2SLS. Instruments in 2SLS include percent Muslim, percent Catholic and percent Protestant; p-value in test of over-identifying restrictions is 0.35 in Eq. 3 and 0.61 in Eq. 6.

and j from the above list were identified as those groups least likely to act as "distributional coalitions" but which involve social interactions that can build trust and cooperative habits. The total memberships per respondent in these three "Putnam" categories range from 0.83 (for the US) to 0.06 (Finland). Groups d, e and i were deemed most representative of groups with redistributive goals; total memberships in these "Olson" groups per respondent range from 0.76 (Iceland) to 0.12 (Korea).

Neither type of group membership is significantly associated with growth in Eq. 2 of Table 5. Paradoxically, "Olson memberships" comes close to being significant but with a positive coefficient. Neither variable is significant in 2SLS tests (Eq. 3) which use percent Muslim, percent Catholic and percent Protestant as instruments.[21]

When entered into investment regressions, "Olson memberships" are not significant. "Putnam memberships" are significant, but with a negative coefficient (Eq. 5). This **negative** coefficient increases substantially in a 2SLS test (Eq. 6), but the standard error rises even more, leaving "Putnam memberships" insignificant.

This attempt at distinguishing types of groups thus provides no empirical support for the supposition that group memberships overall have neutral effects on economic performance because positive externalities generated by "Putnam groups" roughly counterbalance negative externalities generated by "Olson groups." These tests are rather crude; however, the categories of groups are overly broad, making it difficult to distinguish confidently rent seeking from purely social groups, and the depth of commitment to groups is unmeasured. Membership in groups classified here as "Putnam groups" could simply be proxying stronger preferences for leisure, which might harm measurable economic performance.

However, there are serious theoretical deficiencies in the perspectives on groups advanced by both Putnam (1993) and Olson (1982). While some associations may in fact "instill in their members habits of cooperation, solidarity, and public-spiritedness," other (even purely social) groups segregated by class, occupation or ethnicity may build cooperation and trust only among group members, perhaps even encouraging distrust between members and non-members.[22] Olson's predictions on growth and groups overlook the fact that professional and trade associations do more than lobby for legal barriers to entry and tax breaks. They may have positive effects on economic performance by establishing ethical codes and standards that build wide-radius trust (Bergsten 1985), or by reducing transactions costs (e.g. by spreading information about the identity of cheaters [Bernstein 1992]).

For 17 OECD nations, Helliwell (1996) found that an index of group memberships from the WVS was negatively and significantly related to productivity growth. Table 6 replicates the regressions from Table 5, but only for OECD nations, reducing the sample from 26 to 22 nations. Results on the groups' variables are very similar across the two tables. The only significant relationship is the perverse effect of "Putnam memberships" on investment rates, an effect which increases in magnitude but loses precision in 2SLS tests.

7. Conclusion

This paper provides arguments and evidence for the importance of "high-radius trust" in the economic performance of nations. The impact of a rich associational life, as measured by memberships in groups, is less favourable. This finding should not be surprising from an Olsonian (1982) perspective, in which many groups further the well-being of their own members at the expense of the rest of society. In the framework of Table 1, there is little basis for hypothesizing that cooperation and trust **within a group** (i.e. low-radius trust) will be conducive to **national** economic performance. (It may, of course, improve the welfare of members of the group.)

Assuming that the relationship demonstrated here between high-radius trust and economic performance holds up as more data gradually become available (both over time and across countries), an important task for future research is to study more closely the characteristics of governments and societies that build high-radius trust. Under what, if any, conditions do groups generate positive instead of negative spillovers for the rest of society, instilling cooperative habits and public-spirited thinking instead of seeking rents? If "good governance" with reliable legal mechanisms of enforcing contracts and property rights is necessary for high-radius trust to thrive, are sustainable reforms in governance feasible in the absence of social cohesion and cooperative norms? Do some societies simply function better than others, for cultural and historical reasons that are largely immune to policy levers?

Another valuable line of inquiry in cross-country analysis would follow micro-level analysis in employing other indicators of well-being, in addition to measurable economic performance. These could include objective measures (e.g. health and crime), but perhaps most importantly, survey-based indicators of happiness and life satisfaction. According to J.S. Mill (1848, p. 131), "The advantage to mankind of being able to trust one another, penetrates into every crevice and cranny of human life: the economical is perhaps the smallest part of it, yet even this is incalculable." Taking into account the value of leisure, and of transactions facilitated by trust that do not enter the national accounts, more inclusive measures of well-being should be associated with trust in the same way as investment and growth rates.

Notes

[1] For examples using historical cases and data, see North (1990) and DeLong and Shleifer (1993); examples using recent cases and data include Olson (1996) and Knack and Keefer (1995).

[2] La Porta et al. control for per capita income, include all countries with available data, and use trust values from the early 1990's wave. Knack and Keefer control for income and education, exclude formerly communist nations, and use the earliest available observation on trust.

[3] The key distinguishing features of a principal-agent (or "trust" or "one-sided prisoner's dilemma") game compared to the classic prisoner's dilemma are sequential moves (in a single play) and asymmetric payoffs. The principal moves first, for example in deciding whether to hire the agent (or to invest in his or her firm). See, for example, Lichbach

(1996). One could also "trust" that others will not "defect" in coordination games, for example by driving on the wrong side of the road. The concept of trust here is narrower, applying only to prisoner's dilemma and principal-agent incentive structures, where, unlike the case with coordination games, opportunism is an issue.

[4] This classification is based largely on Ellickson (1991).

[5] "In traveling through the United States, Weber observed that many businessmen would introduce themselves as some kind of Christian believer, in order to establish credentials for honesty and trustworthiness" (Fukuyama 1995, p. 46). For believers in a supreme being, religion-based trust presumably would be classified as third-party enforcement.

[6] Shame differs from guilt in that it is activated only when others learn that one has cheated, hence is classified here as second-party enforcement.

[7] In contrast to J.S. Mill, Hobbes in *Leviathan* (1651) viewed government as the sole source of trust between strangers.

[8] In the US, employers often use credit bureaus to investigate job applicants. Bad credit is viewed as a predictor of shirking and thievery.

[9] However, intra-ethnic collective action (e.g. among the Bosnian Serbs) directed against another ethnic group (e.g. the Bosnian Muslims) often stimulates collective action within the targeted group, reducing or even eliminating any benefits of collective action for the first group.

[10] For 26 of the 40 nations, data on respondents' levels of trust in their own families are also available. The country-level correlation between the two trust measures is only 0.24.

[11] An unattended stroller on a New York City sidewalk resulted in the arrest of a Danish mother in 1997 ("Neglect Charge Dropped in Danish Baby Case," *New York Times*, May 22, 1997: B4). The frequency of unlocked bicycles in public areas has been apparently declining in Scandinavian cities in recent years.

[12] At the individual level, of course, a non-trusting person could be very trustworthy while a trusting person may be untrustworthy. However, Glaeser et al. (2000), using a novel combination of experimental and survey data from Harvard students, find that the standard trust survey item predicts trustworthy behaviour better than it predicts trusting behaviour. Their findings cast some doubt on the validity of the trust item at the individual level, but provide support for its validity at the aggregate level.

[13] In the absence of any other information, responses may reflect primarily trust in the other country's government. Eurobarometer surveys show a striking rise in trust in the Chinese between 1970 and 1986. Given the very limited information most respondents could have had regarding the behaviour of the Chinese people toward each other or toward foreigners, this increase (from a very low initial level) is in all probability attributable to changes in Chinese governmental policies over the period. Eurobarometer data on trust by Europeans in the Chinese, Russians and Japanese are omitted from the analysis that follows because of the very limited information most respondents could have had on the behaviour of the nationals (as opposed to the governments) of those countries in 1980.

[14] However, Knack and Keefer (1997) find that TRUST and trustworthy attitudes are similarly related to investment and growth in their 29-nation sample.

[15] In the 29-nation sample in Knack and Keefer (1997), TRUST was no longer significant in growth regressions when investment was included as a regressor.

[16] Based in part on a discussion by Putnam (1993), La Porta et al. (1997) classify these as "hierarchichal religions" with inimical effects on interpersonal trust. The first-stage regression explains 76 percent of the variation in TRUST; in the absence of the religion variables, income, schooling and investment goods prices explain only 50 percent.

[17] The higher coefficient on trust in 2SLS is consistent with the possibility that simultaneity bias could take the form of higher growth, reducing trust: Olson (1963), among others, has argued that rapid growth can disrupt traditional social structures and ties.

[18] More precisely, the interaction term was specified as the product of the deviations of TRUST and 1970 per capita GDP from their sample means; this modification leaves the coefficient and standard error for the interaction term unchanged, while making the coefficients on TRUST and on per capita GDP more readily interpretable.

[19] Adam Smith had long before noted the rent-seeking potential of groups: when "people of the same trade" meet "even for merriment and diversion" the result is often "a conspiracy against the public" or "some contrivance to raise prices" (quoted in Granovetter 1985, p. 484). Associational life may also be conducive to violent revolution. Marx blamed the inability of the 19th century French peasantry to overthrow capitalism on the absence of dense networks of social interaction: the peasants did not enter into "manifold relations with one another..." (quoted in Hardin 1982, p. 189).

[20] This measure – like those Putnam (1993) used for Italy – does not capture informal networks, which he also considers to be important.

[21] Percent Protestant is positively related to group memberships, but not to TRUST, controlling for percent Muslim and Catholic, explaining why only the latter two variables were used as instruments for TRUST in section 5.

[22] In later work, Putnam (e.g. 1995, p. 665) is more careful to note that some social networks facilitating cooperation among their members can have detrimental effects for the wider community.

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10

The Contribution of Human Capital and Urbanization to Canadian Regional Growth[1]

Serge Coulombe

1. Introduction

The Canadian federation is an interesting source of empirical evidence concerning regional growth patterns for two reasons. First, due to Statistics Canada's work, many provincial data are available on a long time-series basis. Second, up to World War II, regional disparities in per capita income across the Canadian provinces were already remarkably high and then, in 1949, the entry of Newfoundland into the Canadian federation contributed to a worsening of the situation. In the 1950s and 1960s, according to Williamson (1965), the degree of regional disparity was greater in Canada than in other industrialized nations. But since the 1950s – as analysed in a series of Canadian studies carried out in the 1990s – the evolution of a variety of economic indicators (e.g. per capita income, earned income, output, and labour productivity) across the 10 Canadian provinces has been characterized by both β- and σ-convergence.[2] The poorer provinces have tended to grow faster than the rich ones (β-convergence) and the dispersion of economic indicators has shown a tendency to decrease over time (σ-convergence).

In this paper, we synthesize and extend the empirical analysis of two recent studies on the convergence of the Canadian provinces. In the first, Coulombe and Tremblay (2000) apply the theoretical framework of Barro, Mankiw and Sala-i-Martin (1995) – henceforth BMS – to the analysis of absolute convergence of per capita income and human capital indicators across the 10 Canadian provinces. In the second, Coulombe (2000) employs the conditional convergence model of Barro and Sala-i-Martin (1995) to explain the relative evolution of per capita income across the Canadian provinces in the 1950 to 1996 period. Coulombe uses relative rates of urbanization as environmental variables for steady-state provincial relative per capita income. In this paper, we analyse the interactions among human capital, urbanization, shocks to steady states, and the growth of relative per capita income across Canadian provinces in a conditional convergence framework.

The main finding of this study is that most predictions of the BMS (1995) framework are not rejected by Canadian regional empirical evidence. Both provincial relative human capital ratios and per capita incomes have converged, at an annual rate of approximately 5 percent, and the quantitative effects of urbanization and regional shocks to relative human capital and per capita income are similar, with one exception: in Alberta, the 1973 oil shock contributed to the rise in per capita income but not in human capital. In comparison, however, the negative shock in 1970 to Quebec's convergence path appears to have affected the evolution of both human capital and per capita income. Finally, we analyse the robustness of Coulombe's (2000) results with alternative panel-data econometric specifications.

The theoretical framework is highlighted in the following background section. The empirical methodology and the data are discussed in section 3 and the results presented in Section 4. We conclude in section 5 with a broad discussion of the determinants of regional growth.

2. Background

After years of focussing on business cycles, empirical macro-economics came back to the study of comparative growth in the late 1980s with the work of Baumol (1986), Barro (1991), Barro and Sala-i-Martin (1992), and Mankiw, Romer and Weil (1992).[3] The convergence property of the neo-classical growth model was the underlying framework of many of the new cross-country/region studies. Convergence implies that the steady-state equilibrium level of per capita income or output y^*_i (defined in efficiency units of labour) in economic unit i is independent of its initial $y_{i,0}$ value. During the convergence process toward steady state, the evolution of the logarithm of $y_{i,t}$ at time t is a weighted average of $y_{i,0}$ and y^*_i. Following Barro and Sala-I-Martin (1995), for periods of unit length (such as years), the convergence property could be written as

$$\log(y_{i,t}) = e^{-\beta} \log(y_{i,t-1}) + (1-e^{-\beta}) \log y^*_i \tag{1}$$

where parameter β is the annual speed of convergence. The economy converges to y^*_i if β is a positive fraction. With an additive error term, Eq. 1 can be tested in different ways. First, in a cross-sectional framework, Eq. 1 could be tested across N economic units for a sample of T years using only the information on $y_{i,T}$, $y_{i,0}$, and y^*_i. Second, using a pure time-series framework, it can be tested for one economic unit in a sample of T periods. Finally, cross-sectional and time-series information could be pooled in a sample of T periods across N economic units. We will follow this approach in our empirical analysis of the Canadian provinces' data set.[4]

In an absolute convergence analysis of a cross-section of countries/regions, y^*_i is assumed to be identical across the N cross-section observations. In a conditional convergence analysis, the N cross-section units are allowed to converge to different steady states y^*_i. In cross-country studies of developing and developed countries, the steady states y^*_i depend on a group of environmental variables associated with the institutional, social, political, demographic and economic policy frameworks.[5] But, in the study of regional growth within a developed country, the choice of the environmental determinants of y^*_i is more limited since most environmental cross-country variables can reasonably be assumed to be constant across relatively homogenous regions of a country such as Canada.

In this study, we follow Coulombe (2000) by using a variable based on relative urbanization rates to account for the different economic structures across the Canadian provinces. Carlino and Voith (1992) find that the percentage of the population living in metropolitan areas is an important determinant of aggregate productivity differentials across the US states. Furthermore, based on US state data covering the 1840 to 1890 period, Ades and Glaeser (1999) conclude that urbanization could be considered as a "reasonable proxy for economic development." One could think of modelling relative y^*_i with the relative urbanization rate as a way of capturing agglomeration economies from a core-periphery structure as in Krugman (1991). A wide country with a sparsely distributed population concentrated close to its southern border with the US, Canada is a good candidate for the core-periphery structure since urbanization rates vary considerably across provinces.

The second theoretical framework used in this paper is borrowed from Coulombe and Tremblay's (2000) empirical application of BMS' (1995) open economy growth model, with its binding constraint for the financing of human capital, to the study of Canadian regional data sets. In their framework, BMS (1995) assume that physical capital could be financed abroad at the world interest rate whereas domestic residents cannot borrow abroad using human capital as collateral. In this framework, human capital accumulation becomes the driving force of output growth. In the case of a Cobb-Douglas production function with physical and human capital, BMS demonstrate that output per unit of labour $y_{i,t}$ could be expressed as a function of the human capital/labour ratio $h_{i,t}$ and exogenous parameters in the following way:

$$y_{i,t} = Bh_{i,t}^{\frac{\eta}{1-\alpha}} \qquad (2)$$

Here, α and η are, respectively, the elasticity of output with respect to physical and human capital; B is an exogenous parameter that should be constant across relatively homogenous economies. Coulombe and Tremblay's (2000) analysis of human capital convergence across the Canadian provinces is based on the absolute convergence hypothesis. In this paper, we extend their empirical framework to the study of conditional convergence. Combining Eqs. 1 and 2 yields the following modified conditional convergence equation:

$$\log(h_{i,t}) = e^{-\beta} \log(h_{i,t-1}) + (1-e^{-\beta}) \log(h^*_i) \quad (3)$$

The same relative urbanization variable will be used as an instrumental determinant of the relative h^*_i. If y is a function of h as stated by Eq. 2, both should behave in a relatively similar manner in the convergence process toward steady state.

This set-up differs considerably from the one used in many cross-country studies, as in Barro (1997, 2001), where relative initial level of human capital $h_{i,0}$ is a determinant of the relative steady state of y^*_i. We will return to this difference in the role of human capital in the conclusion.

3. Empirical Methodology

The purpose of the empirical analysis is to verify if both relative $h_{i,t}$ and $y_{i,t}$ converge, at around the same speed as shown by Eqs. 1 and 3, to different long-run steady states determined by the same urbanization variable.

3.1 The Data

Our choice of human capital indicators is based on the analysis of Coulombe and Tremblay (2000). According to this study, the best available proxies of human capital at the regional level in Canada come from the percentage of males and of the population of both sexes in the population 15 years or over, and 25 years or over, who have achieved at least one university degree. In their absolute convergence framework, Coulombe and Tremblay (2000) find that (a) these indicators of human capital did converge roughly at the same speed as per capita income during the 1951 to 1996 period, and (b) the estimates of the human capital share in national income were around 0.5, a number consistent with findings in other studies.

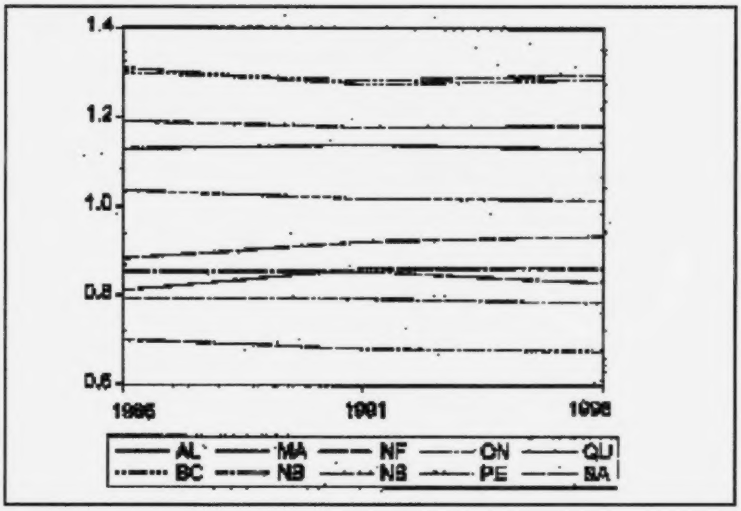
The data are taken from Statistics Canada's censuses of 1951, 1961, 1971, 1981, 1991 and 1996. For the growth regressions, human capital indicators (in common with all other variables) are measured as logarithmic differences from the unweighted sample mean. Such indexes based on the percentage of the population with at least one university degree might be useful mainly for measuring the relative stock of human capital in an economy, rather than its level, given that the provincial educational systems in Canada are relatively homogenous.

Regarding income per capita, we use provincial personal income less government transfers to individuals for the 1950 to 1996 sample.[6] As shown in previous Canadian studies following Coulombe and Lee (1995), the exclusion of transfers is important for the analysis of Canadian regional convergence, given that a substantial part of personal income disparities across Canadian provinces is smoothed by inter-regional redistribution through fiscal federalism and the tax-transfer system.

We use the urbanization variable of Coulombe (2000) computed by Ray Bollman from Statistics Canada from census data on rural/urban populations. The urban population is defined as the population living within census metropolitan areas and census agglomerations over 10 000 inhabitants. We computed one observation per province for the relative index of urbanization relative to the unweighted provincial mean urbanization rate. Despite increased urbanization since World War II, relative rankings of provinces did not change very much in recent years (see Figure 1). Since the distribution of the relative index of urbanization across the provinces appears to be comparatively stable, we assume that the relative indexes could be considered as good candidates to proxy regional differential economic structures.

Figure 1

Relative urbanization rates



3.2 Econometric Methodology

All variables are measured as deviations from the sample mean.[7] Three different panel frameworks are used. First, for the per capita income convergence regressions (1), (2) and (3) of Table 1, we pool annual data for the 10 Canadian provinces in the 1950 to 1996 sample as in Coulombe (2000):

$$\begin{aligned} GY_{i,t} = {} & \gamma_1 Y_{i,t-1} + \gamma_2 UR_i + \gamma_3 DA_{i,t} + \gamma_4 DQ_{i,t} \\ & \gamma_{5,i} AR(1) + \gamma_{6,i} AR(2) + \varepsilon_{i,t} \end{aligned} \tag{4}$$

$Y_{i,t}$ is per capita income of province *i* at time *t* and $GY_{i,t}$ is its annual growth rate. UR_i is the urbanization variable and *DA* and *DQ* are regional dummy variables. *DA* takes the value zero for all provinces except Alberta for which it is zero prior to 1973 and 1 thereafter. This variable is intended to capture the effect of the oil shock. *DQ* takes the value zero for all provinces except Quebec for which it is zero prior to 1970 and 1 thereafter. It is intended to account for the decline in economic activity in Montreal.[8] Finally, $\varepsilon_{i,t}$ is the error term. The variables *UR*, *DA* and *DQ* are the environmental variables used to proxy the y^*_i in Eq. 1. In this framework, Alberta's and Quebec's convergence paths were disturbed by a one-time shock to their respective relative steady-state per capita income in 1973 and 1970, respectively. Given the relatively high frequency of annual data for the study of long-run growth patterns, we correct each cross-sectional unit separately for autocorrelation with *AR*(1) and *AR*(2) terms. Note that $-\gamma_1$ is the mean annual speed of convergence for the 10 provinces in the sample.

Human capital data are not available on a yearly basis. In order to have a specification for the convergence of per capita income that is more comparable to the one used for human capital, we use a second specification of regression Eq. 4 based on periods of five years in the 1950 to 1995 sample for regression (4) in Table 1. In this framework, the *AR* parameters were not significant and were dropped from the regressions. Both the Alberta and Quebec dummy variables were found to be significant in 1970. With five-year periods, the mean annual speed of convergence is $-\log(1-5\gamma_1)/5$.

The third panel specification tests human capital convergence from Eq. 3 for regressions (5) to (8) in Table 2:

$$GH_{i,t} = \gamma_1 H_{i,t-T} + \gamma_2 UR_i + \gamma_4 DQ_{i,t} + \varepsilon_{i,t} \tag{5}$$

Table 1

Regressions for per capita growth rate *GY*

	(1) IFGLS	(2) SUR	(3) SUR	(4) IFGLS
Observations	440	440	440	90
Y(-1)	-0.0506 (0.0135)	-0.0436 (0.0055)	-0.0411 (0.0052)	-0.0423 (0.0077)
UR	0.0393 (0.0142)	0.0286 (0.0076)	0.0262 (0.0074)	0.0339 (0.0086)
DQ	-0.0052 (0.0021)	-0.0012 (0.0013)		(-0.0037) (0.0014)
DA	0.0078 (0.0033)	0.0049 (0.0013)	0.0039 (0.0008)	0.0066 (0.0027)
Convergence speed	0.0506	0.0436	0.0411	0.0533
Elasticity to *UR*	0.78	0.66	0.64	0.8
R^2	0.23	0.13	0.13	0.2

Notes: Standard errors in parentheses. Details on estimation procedures in section 3.2.

Table 2

Regressions for human capital indicator growth rate *GH*

Human capital indicator	**(5) M15**	**(6) M25**	**(7) P15**	**(8) P25**
Observations	50	50	50	50
H(-1)	-0.0454 (0.0081)	-0.0511 (0.0067)	-0.0490 (0.0046)	-0.0559 (0.0056)
UR	0.0306 (0.0089)	0.0394 (0.0071)	0.0267 (0.0047)	0.0391 (0.0056)
DQ	-0.0029 (0.0015)	-0.0038 (0.0009)	-0.0042 (0.0010)	-0.0051 (0.0012)
Convergence speed	0.0583	0.0684	0.0464	0.0777
Elasticity to *UR*	0.67	0.77	0.54	0.7
R^2	0.72	0.75	0.79	0.77

Notes: M15 (M25) refers to the percentage of males for the population 15 years or over (and 25 years or over) who have achieved at least one university degree. P15 (P25) refers to the percentage of the population of both sexes for the population 15 years or over (and 25 years or over) who have achieved at least one university degree. Details on estimation procedures in section 3.2.

Here, data are available for 10-year periods from 1951 to 1991, and for the year 1996. $H_{i,t-T}$ is the relative human capital indicator at the beginning of the period and $GH_{i,t}$ is its mean annual relative growth rate during the period. The Alberta dummy variable was not significant and was dropped from the regressions. The annual speed of convergence is $-\log(1-9\gamma_1)/9$ where 9 is the period mean.

Two different estimation procedures were used. First, in most regressions, we use iterated feasible generalized least squares (IFGLS) to account for cross-section heteroscedasticity with cross-section weighting. We are also using White's heteroscedasticity consistent errors and co-variance estimates to allow cross-sectional variances to differ across time. Second, for regressions (2) and (3) in Table 1 for the annual data specification of Eq. 4, we use SUR-weighted least squares to account for both cross-section heteroscedasticity and contemporaneous correlation. We were unable to estimate SUR-weighted least squares for the human capital and the five-year period income regressions, given the limited number of cross-section and time-series observations.[9]

4. The Results

Convergence regression results are displayed in Tables 1 and 2. Interestingly, R^2 values are much higher for human capital than for per capita income regressions. The conditional convergence hypothesis explains a much larger proportion of the evolution of human capital than of income in Canada.

Convergence Speeds

All conditional convergence speeds (estimated coefficient of $Y(-1)$ and $H(-1)$) are highly significant and vary, on an annual rate (convergence speed in Tables 1 and 2), between 4.1 and 5.3 percent for per capita income and between 4.6 and 7.8 percent for human capital indicators. As expected, these conditional convergence speeds are higher than the absolute convergence speeds estimated in previous Canadian studies, including the human capital convergence analysis of Coulombe and Tremblay (2000). Omitting the determinants of long-run steady states, absolute convergence analyses tend to underestimate the convergence speed.[10] Wald tests indicate that the null hypothesis of equality between the convergence speeds of indicators of human capital based on the males and on the population of both sexes 15 years or over (regressions (5) and (7)), and the convergence speed of per capita income of regressions (1) and (4) could not be rejected. Human capital indicators based on the population 25 years or over, however, have converged significantly faster than per capita income for a relatively comparable estimation procedure (IFGLS). Consequently, the prediction of the BMS (1995) framework of both human capital and income converging at the same speed could not be rejected for the human capital indicators from the population 15 years or over.

Urbanization Variable

In all regressions, estimated coefficients of the urbanization variable *UR* are positive and very significant. The quantitative effects of relative urbanization rates on long-run relative human capital or income steady states (*UR* elasticity in Tables 1 and 2) do not differ much across different regression frameworks, ranging from 0.54 to 0.80 percent. These results indicate that, in a rich province with an urbanization rate 10 percent higher than the average, per capita income and human capital would be higher at steady state than the provincial average by an amount ranging from 5.4 to 8.0 percent.

Interestingly, the *UR* elasticity is higher for human capital indicators based on the population 25 years or over than for the population 15 years or over. One explanation of this result might be that the educated young people in poorer Canadian provinces tend to migrate to rich provinces as they age. This is a well-known fact from many Canadian interprovincial migration studies.

Quebec Dummy Variable

In all regression set-ups using IFGLS, Quebec's 1970 dummy variable *DQ* is significant at the 5 percent level with the exception of the human capital regression from males 15 years or over for which its p-value is 6.6 percent. In the SUR set-up of regression (2), the Quebec dummy variable was not significant and was dropped in regression (3). Dynamic simulations described in a later section, "SUR versus IFGLS with cross-section weighting," indicate that it might be misleading to drop Quebec's 1970 dummy variable. The quantitative effect of the negative Quebec shock on the relative human capital steady state varies from 6.4 to 8.6 percent in regressions (5) to (8). The negative long-run effect of the shock on relative per capita income is 8.7 percent in regression (4) and 10.3 percent in regression (1). Coulombe (2000) associates this shock with the economic decline of Montreal relative to Toronto and with the exodus of the well-educated English-speaking minority from the 1970s on.[11] The new results regarding human capital convergence regressions appear to support our initial diagnosis since both human capital and personal income were affected in the same way by the shock.

Alberta's Oil Shock

Alberta's dummy variable that captures the 1973 oil shock is significant at the 5 percent level in all income regressions but is not significant (with p-values ranging from 30 to 60 percent) in all (not reported) human capital regressions. The *DA* variable was dropped from the reported result in Table 2. The long-run positive-level effect on the relative per capita income in Alberta varies from 9.5 and 11.2 percent in the two SUR set-ups to 15.4 and 15.6 percent in the IFGLS regressions. These interesting results suggest that the oil shock did contribute to the substantial rise in Alberta's income. However, it did not encourage the formation of human capital through university education investment and migration into Alberta.

Incomes, but not human capital, converged to the oil barrel. The type of economic activity related to oil extraction and exploration might not be very intensive in human capital.

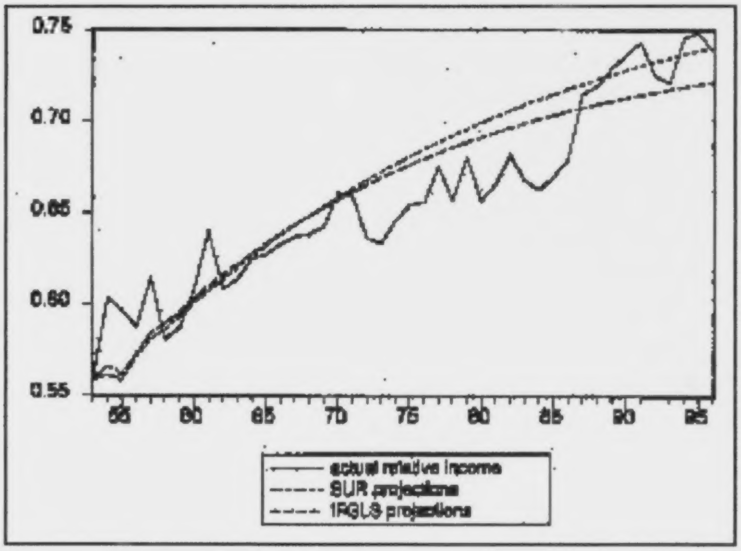
SUR Versus IFGLS with Cross-Section Weighting

The two different econometric set-ups of income regression produce substantially different results regarding the speed of convergence and the significance of Quebec's dummy variable. With SUR weighting, the speed of convergence is around 4.4 percent and Quebec's dummy variable is not significant; with the IFGLS cross-section weighting, the speed of convergence is just over 5 percent and Quebec's dummy variable is very significant. To evaluate these conflicting results, we generated panel-data models using estimated parameters from regression Eqs. 1, 3 and 4. We then proceeded to carry out dynamic simulations using historical data to 1953 in the annual set-up and to 1950 in the five-year period framework.

It is certainly a challenge to try forecasting more than 40 years of relative regional evolution. We were surprised, however, by the general fit between the predicted path and the actual data for most provinces, especially with the five-year period set-up of regression (4). Figure 2 illustrates the dynamic forecast for the relative per capita income of Newfoundland using the SUR and the IFGLS regressions in the annual set-up.

Figure 2

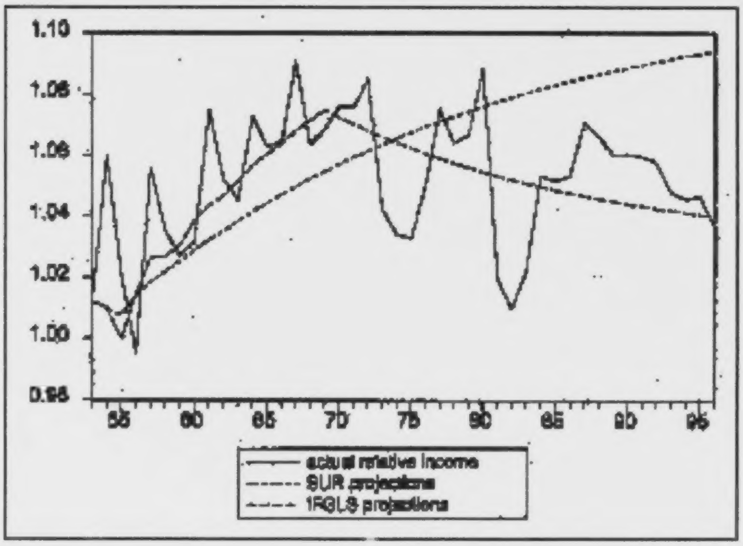
Dynamic simulation of alternative regression models, Newfoundland



Both models are good candidates to represent the long-run convergence pattern of Canada's poorest province toward its long-run relative steady state (not shown in Figure 2) below the provincial average. In both cases, Newfoundland appears to be in the neighbourhood of its long-run relative equilibrium by the end of the sample. Given the high degree of annual variation in the actual data, it is hard to guess which formulation best describes the historical behaviour. Such dynamic simulations are very sensitive to the choice of starting date since the initial year, 1953 in this case, determines the level of the convergence path toward steady state. But Figure 3, dealing with Quebec, is more revealing.

Figure 3

Dynamic simulation of alternative regression models, Quebec



The IFGLS of regression (1), borrowed directly from Coulombe (2000), is very good at tracking the broken convergence path of Quebec, disturbed in 1970 by the shock of Montreal's decline. However, the SUR representation of regression (3) does a poor job, undershooting the actual path up to 1973 and overshooting it thereafter. In the last years of data, the SUR projection does not reflect the actual evolution in Quebec.

Five-Year-Period IFGLS Dynamic Simulations

The last reported results deal with the dynamic simulations of the model created from regression (4). Four cases are displayed in Figures 4 to 7.

Figure 4

Dynamic simulation of the 5-year-period models, Quebec

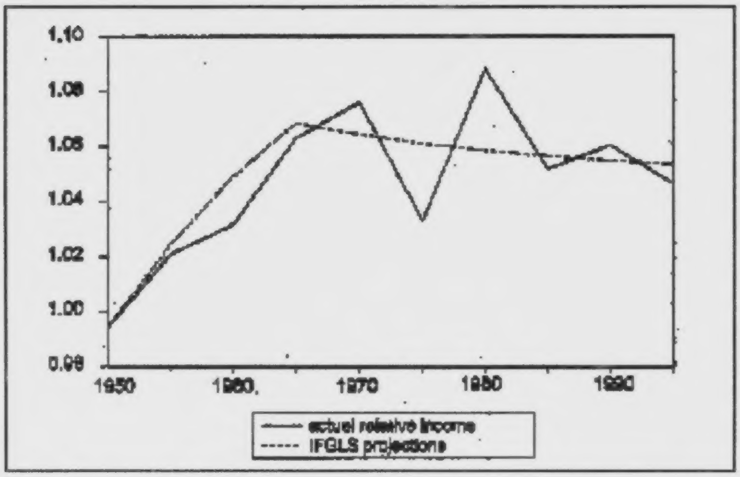


Figure 5

Dynamic simulation of the 5-year-period model, Ontario

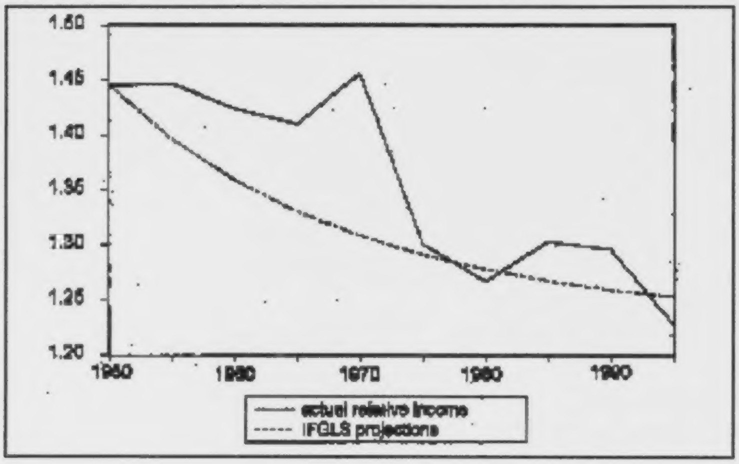


Figure 6

Dynamic simulation of the 5-year-period model, Newfoundland

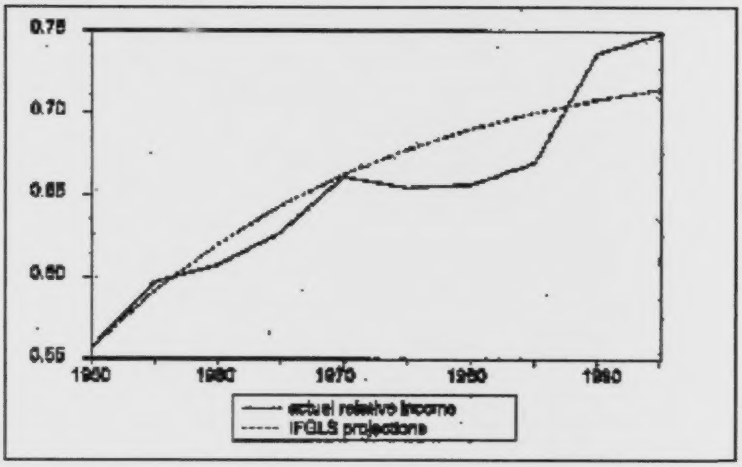
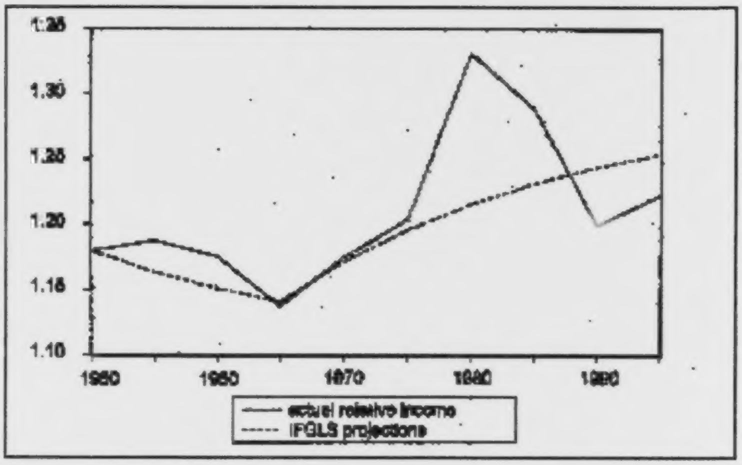


Figure 7

Dynamic simulation of the 5-year-period model, Alberta



In all cases, and for the other six non-reported cases as well, the fit between the predicted convergence path and the actual data is surprisingly good. Quebec and Newfoundland are again reported to provide comparisons with the annual models. The effect of the oil shock on Alberta's relative income is illustrated in Figure 7. The convergence path of the relatively rich province of Ontario from an initial relative situation above steady state is depicted in Figure 5.

Alternative Specifications

Contrary to the broad cross-country sample of Barro (2001), the convergence process appears log-linear as in his OECD sample. For example, when the square of $Y_{i,t-1}$ is added to the specification of regression Eq. 4, the variable is not significant with a p-value of 43 percent.

If the initial level of human capital is added as an independent variable (jointly with the initial level of income) to the specification of regression Eq. 4, the variable is not significant with a p-value of 57 percent for the P15 human capital indicator. Again, this result appears similar to Barro's (2001) findings for the income growth rate regression in the OECD sample. In the case of perfect capital mobility, it is a miss-specification to use both the log of $y_{i,0}$ and $h_{i,0}$ as independent variables in a convergence regression. In relative terms, both variables should be proportional according to Eq. 2. Coulombe and Tremblay's (2000) direct estimation of a linear version of Eq. 2 illustrates the collinearity between the two variables. When the log of relative $y_{i,t}$ is regressed on the log of relative $h_{i,t}$ in the 1951 to 1996 sample (without a constant), in the case of the P15 indicator of human capital, the estimated coefficient is 0.73 and the R^2 is 0.76. The implicit estimated human capital share η, which is $0.73(1-\alpha)$, is 0.49 and is consistent with other measures of the human capital share as in Mankiw, Romer and Veil (1992).

Finally, when the initial level of income is dropped from the specification of regression Eq. 4 and the initial level of human capital is added as an independent variable, the human capital variable is highly significant, as in Coulombe and Tremblay (2000). In the case of the P15 human capital indicator, the estimated coefficient is -0.007 with a t-statistic of -6.8. In this case, however, the urbanization variable is no longer significant. This modified income convergence regression underlines a causal relationship from initial human capital to future income growth.

5. Concluding Discussion

The analysis in this paper illustrates the usefulness of the conditional convergence model and of the neo-classical growth model of an open economy by BMS for explaining regional developments in Canada since 1950. Since World War II, it appears that both relative per capita income and human capital indicators in the Canadian regions did converge at a speed of about 5 percent per year to different long-run steady states, determined mainly by relative urbanization. The analysis appears robust to pooling periods of one, five and ten years and to alternative econometric specification. Furthermore, models created from panel regressions illustrate the usefulness of the approach with dynamic simulations.

The usefulness of the time-series dimension of the study over the pure cross-section approach is highlighted by the structural shocks to the relative steady state of Alberta and Quebec in the 1970s. The two shocks did not appear symmetrical. The shift of economic activity from Montreal to Toronto translates into a decrease of both relative human capital and per capita income in Quebec. In Alberta, the oil shock was an attractor of income and people but did not appear to affect the relative human capital ratio significantly compared with the other provinces. Given the relative slowness of the convergence process, a one-time shock to steady state has a long-lasting effect on growth rates and implies a change in the slope of the convergence transitory path.

This paper ends with a discussion of the role of human capital and urbanization in economic growth. In broad, cross-country per capita growth studies such as Barro (1997, 2001), the initial relative level of human capital - habitually measured by advanced educational achievement - is often used as an initial state variable. Initial human capital, especially university education of males, appears to produce in this framework a significant positive effect on per capita growth. In this paper, however, human capital is instead used as an endogenous variable in the convergence process; and it performed its role extremely well, better even than per capita income. The difference in the role of human capital in the two types of studies might be attributed to the **heterogeneity** problem raised by Harberger in 1987 regarding broad-sample cross-country regressions.[12] In a cross-country regression including Nepal, Japan, Canada, Spain, Guatemala and Algeria, the initial level of human capital might be a good proxy for the substantial differences, to say the least, in the political, institutional and social (PIS) characteristics across the countries. It might be the differences in the PIS characteristics that make the initial human capital state variable significant with a positive sign. In Canada (perhaps with the exception of Quebec whose French cultural heterogeneity is captured with a dummy variable in this paper), the PIS characteristics are relatively homogenous across the provinces. In this relatively homogenous data set, initial human capital is negatively correlated with future income growth by the convergence framework since per capita income is a function of human capital, and initial income is negatively correlated with future growth. But in a homogenous empirical framework, human capital does not capture PIS heterogeneity; it captures only what it is – human capital. And it is endogenous to the growth process.

The same could be said about other variables such as the one for population growth. This variable might reflect a good amount of PIS heterogeneity in broad cross-country growth studies whereas it might reflect a completely different situation in studies of Canadian regions. Across Canadian provinces, population growth is driven mainly by interprovincial and international migration and people are known to migrate to the rich provinces of Ontario, Alberta and British Columbia. In international studies of developing and developed countries, the population growth variable might capture effects related to the role of women within the family, the society and other key social organizations that are very hard to measure.

But the geographical, climatological and the natural resources (GCR) characteristics of the Canadian provinces are not that homogenous. The dummy variable for Alberta's oil shock captures part of the GCR heterogeneity associated with resources endowment. However, part of what remains in the GCR heterogeneity may be captured by the urbanization variable. Maybe people and human capital congregate in pleasant, safe areas in good locations with an agreeable climate. Perhaps these factors are driving the urbanization variable. But this variable might capture many other factors that are hard to measure; many things occur when many people assemble in one location.

The choice of language used in economic activities and the educational system might be viewed as one characteristic of the social network. In this context, Quebec's 1970 dummy variable might be viewed as representing the shift from English to French as the dominant economic language. The well-educated English-speaking minority of Montreal might not have been comfortable with this shift affecting their social network and might have decided to move out of the province. From an aggregated point of view, there was a negative effect on the Quebec growth path, as illustrated in this study. But, as shown in Coulombe (2000), French-speaking Quebeckers' incomes have been closing the gap with Ontario's incomes since 1970. With the exodus of its English elite, Quebec as a province might be poorer, but the income of its French-speaking population has risen.

Notes

[1] Some empirical results are taken from Coulombe (2000), which is forthcoming in Regional Studies.

[2] Empirical studies on the convergence of Canadian regional data include Coulombe and Lee (1993, 1995, 1998), Helliwell and Chung (1991), Helliwell (1994), Lee (1997), Lee and Coulombe (1995) and Lefebvre (1994). Coulombe and Day (1999) provide a comparative analyses with US border states. The Canadian regional growth studies on con-

vergence are reviewed and synthesized in Coulombe (1999).

[3] For a survey of the new growth evidence, see Temple (1999).

[4] For a discussion of empirical methodology associated with the estimation of Eq. 1, see Barro (1997, chapter 1) and Temple (1999, sections 3 to 5).

[5] See Barro (1997) for an example of conditional convergence cross-country studies.

[6] Personal income data were taken from the CANSIM series D11701-D11710; data for government transfers were taken from various series in Statistics Canada Catalogue No. 13-213.

[7] Variables are entered in the regressions as $\log(Xi,t/\text{MEAN}(Xi,t)$ where $\text{MEAN}(Xi,t)$ is the unweighted mean of Xi,t across the 10 units i.

[8] For more detail on the choice of the date of the structural shock and the possibility of shocks to other provinces, see Coulombe (2000).

[9] Estimations and dynamic simulations were performed using EViews 3.1.

[10] For a discussion of this problem, see Barro (1997, Chapter 1).

[11] See Coulombe (2000) for a broad discussion on the Quebec shock.

[12] For an analysis of this point, see Temple (1999, section 4.1).

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11

Accounting for the Social and Non-Market Benefits of Education[1]

Barbara Wolfe and Robert Haveman

Introduction

The contribution of human and social capital, especially schooling, to economic growth and well-being have typically focussed on market outcomes, particularly labour market returns. In this paper, we focus on the social and non-market effects of education. We argue that these effects are large, perhaps as large as the marketed effects of education, and hence must be considered to correctly evaluate the optimum level of social (and public-sector) investment in schooling. We first catalogue the non-market and social outcomes of schooling, and identify the literature that discusses the evidence of such impacts. A number of published studies have attempted to assess the non-market effects of schooling.[2] This paper updates their results where possible and expands the discussion to include results from the experiences of developing countries.

The catalogue of the non-market and social effects of education is long, and includes such relationships as:

- a positive link between one's own schooling and the schooling received by one's children
- a positive association between schooling and the health status of one's family members
- a positive relationship between one's own education and one's own health status
- a positive relationship between one's own education and the efficiency of choices made, such as consumer choices (which efficiency has positive effects on well-being similar to those of money income)
- a relationship between one's own schooling and fertility choices (in particular, decisions of one's female teenage children regarding non-marital childbearing)
- a relationship between schooling/social capital of one's neighbourhood, and youth decisions regarding their level of schooling, non-marital childbearing and participation in criminal activities.

After presenting the catalogue of non-market effects of schooling, we discuss the research that has documented one channel in this long list, namely the intergenerational effects of schooling. This literature reveals that educational attainment in one generation has positive effects on the human capital attainments of youths (including schooling, non-marital childbearing and crime-related activities) in the next generation. Both the direct relationship of parental human capital (e.g. parental schooling) to the attainment of their children, and the indirect effect through improving the human/social capital environment in the neighbourhoods in which children grow up are discussed. The literature on the intergenerational effects of education is generally neglected in assessing the full impact of education.

Finally, we propose a method for valuing these social and non-market effects of schooling, and present some illustrative estimates of these values.

Evaluation of the optimal level of social investment[3] in education requires a comprehensive assessment of all of the returns to schooling, both market (primarily earnings) and non-market effects. We do not discuss the traditional returns to education in the form of earnings, as we concentrate on the oft-neglected non-market impacts.

Non-Market Effects of Education – A Catalogue

OECD countries spend between 3.3 and 6.9 percent of their Gross Domestic Product (GDP) on public direct expenditures for education. Table 1 presents these estimates, using data drawn from the US Department of Education 1998 and 1999 *Digest of Education Statistics* (see Snyder 1999, table 412).[4] Turkey is at the low end, while the Nordic countries are at the high end. At the primary level of education, the variance ranges from 0.8 percent of GDP for Germany to 2.5 percent for Norway. Absolute spending for primary education is the highest in Switzerland – $5,835 per student (in 1993 in 1993 dollars) – with the US close behind (at $5,492). At the secondary level, Switzerland again records the highest per student expenditure at $7,024, while Austria, US, Germany and Denmark all spent more than $6,000 per student in 1993. For higher education, Switzerland and the US have the highest expenditures per pupil at $15,731 and $14,607, respectively.[5] For the US, 80.6 percent of total expenditures on schooling were allocated by the public sector in 1993-94, including 92.3 percent of the expenditures for elementary and secondary education. This large absolute and proportional public expenditure pattern also exists in most other OECD countries, suggesting the relatively small contribution of private spending in this area. A result of this lack of private market activity is the absence of evidence on beneficiary willingness to pay for education – or the individual private value of an additional year of schooling – even though private willingness to pay may be very high.

Table 1

Total public direct expenditures for education as a percentage of GDP, by level of education, 1990 and 1994

	All\1\		Primary		Secondary		Higher	
Country	**1990**	**1994**	**1990**	**1994**	**1990**	**1994**	**1990**	**1994**
Australia	4.3	4.4	—	1.4	—	1.8	1.0	1.1
Austria	5.2	—	0.9	—	2.5	—	1.0	—
Belgium	5.1	5.5	0.9	1.2	2.2	2.6	0.8	1.0
Canada	5.4	6.0	\2\	\2\	\2\	\2\	1.5	1.6
Denmark	6.2	6.5	1.7	1.5	2.7	2.8	1.3	1.4
France	5.0	5.6	1.0	1.1	2.4	2.9	0.7	0.9
Germany\3\	—	4.5	—	0.8	—	2.1	—	0.9
Ireland	4.9	5.1	1.4	1.4	2.0	2.2	1.0	1.0
Italy	5.2	4.6	1.1	1.1	2.2	2.2	1.0	0.7
Japan	3.4	3.8	—	1.4	—	1.6	—	0.5
Luxembourg	—	—	—	—	—	—	—	—
Netherlands (The)	5.7	4.5	1.3	1.2	2.2	1.8	1.6	1.2
New Zealand	6.2	5.4	1.6	1.5	1.5	2.4	2.2	1.1
Norway	5.9	6.9	1.5	2.5	2.4	1.6	1.1	1.4
Portugal	—	5.3	—	1.8	—	2.1	—	0.8
Spain	4.3	4.8	1.0	1.0	2.3	2.5	0.7	0.8
Sweden	5.3	6.6	1.9	2.0	2.3	2.5	1.0	1.5
Switzerland	—	5.5	—	1.6	—	2.5	—	1.1
Turkey	—	3.3	—	1.4	—	0.7	—	1.2
United Kingdom	4.7	4.6	1.2	1.6	2.1	2.2	0.9	0.7
United States	5.3	4.8	1.7	1.6	1.9	—	1.4	1.1

\1\ Includes primary, secondary and higher education and other expenditures.

\2\ Primary and secondary combined were 3.7 and 4.2 in 1990 and 1994, respectively.

\3\ Data prior to 1991 are for the former West Germany.

— Data not available.

Source: Organisation for Economic Co-operation and Development, unpublished data.

This table was prepared July 1998 and is reported in http://nces.ed.gov/pubs99/digest98/d98t413.html and http://nces.ed.gov/pubs2000/digest99/d99t419.html for data on Canada and 1990 data for Australia.

Table 2

Catalogue of outcomes of schooling

Outcome	Economic Nature	Existing Research on Magnitude
1. Individual market productivity	Private; market effects; human capital investment	Extensive research on the magnitude of market earnings (Schultz 1961; Mincer 1962; Hansen 1963; Becker 1964; Conlisk 1971)
2. Non-wage labour market remuneration	Private; market and non-market effects	Some research on differences in fringe benefits and working conditions by education level (Duncan 1976; Lucas 1977; Freeman 1978; Smeeding 1983)
3. Intra-family productivity	Private; some external effects; market and non-market effects	Relationship between wife's schooling and husband's earnings apart from selectivity is established (Benham 1974)
4. Child quality: level of education and cognitive development	Private; some external effects; market and non-market effects	Substantial evidence that child education level and cognitive development are positively related to mother's and father's education (Wachtel 1975; Murnane 1981; Sandefur, McLanahan, and Wojtkiewicz 1989; Dawson 1991; Haveman, Wolfe, and Spaulding 1991; Ribar 1993; Duncan 1994; Haveman and Wolfe 1994; Angrist and Lavy 1996; Lam and Duryea 1999; Ermisch and Francesconi 2000). Some evidence that child education is positively related to grandparents' schooling (Blau 1999). Some evidence that education of adults in neighbourhood increases probability of a child's graduating high school (Clark 1992; Duncan 1994; Ginther, Haveman, and Wolfe 2000)
5. Child quality: health	Private; some external effects	Substantial evidence that child health is positively related to parents' education (Edwards and Grossman 1979; Shakotko, Edwards, and Grossman 1981; Wolfe and Behrman 1982; Behrman and Wolfe 1987; Grossman and Joyce 1989; Strauss 1990; Thomas, Strauss, and Henriques 1991; King and Hill 1993; Glewwe 1999; Lam and Duryea 1999)
6. Child quality: fertility	Private; some external effects	Consistent evidence that mother's education is related to a lower probability that daughters will give birth out of wedlock as teens (Antel 1988; Sandefur and McLanahan 1990; Hayward, Grady and Billy 1992; An, Haveman, and Wolfe 1993; Lam and Duryea 1999)

Table 2 (cont'd)

Outcome	Economic Nature	Existing Research on Magnitude
7. Own health	Private; modest external effects	Considerable evidence that own schooling positively affects one's health status (Leigh 1981, 1983; Kemna 1987; Berger and Leigh 1989; Grossman and Joyce 1989; Kenkel 1991; Strauss, Gertler, Rahman et al. 1993); also increases life expectancy (Feldman et al. 1989; King and Hill 1993); also lowers prevalence of severe mental illness (Robins et al. 1984)
8. Spouse's health	Private; modest external effects	Some evidence that own schooling influences spouse's health as well as decreases mortality (Auster, Leveson, and Sarachek 1969; Grossman 1975; Grossman and Jacobowitz 1981)
9. Consumer choice efficiency	Private; some external effects; non-market effects	Some evidence that schooling leads to more efficient consumer activities (Michael 1972; Benham and Benham 1975; Pauly 1980; Rizzo and Zeckhauser 1992). Home-production schooling may have long-term impacts (Corman 1986)
10. Labour market search efficiency	Private; non-market effects	Some evidence that costs of job search are reduced and regional mobility increased with more schooling (Metcalf 1973; Greenwood 1975; DaVanzo 1983)
11. Marital choice efficiency	Private; non-market effects	Some limited evidence of improved sorting in marriage market (Becker, Landes; Michael 1977)
12. Attainment of desired family size	Private	Evidence that contraceptive efficiency is related to schooling (Easterlin 1968; Ryder and Westoff 1971; Michael and Willis 1976; Rosenzweig and Schultz 1989). In developing countries, fertility declines (King and Hill 1993; Lam and Duryea 1999)
13. Charitable giving	Private and public; non-market effects	Some evidence that schooling increases donations of both time and money (Mueller 1978; Dye 1980; Hodgkinson and Weitzman 1988; Freeman 1997)
14. Savings	Private; some external effects	Controlling for income, some evidence that more schooling is associated with higher savings rates (Solomon 1975)
15. Technological change	Public	Some evidence that schooling is positively associated with research, development and diffusion of technology (Nelson 1973; Mansfield 1982; Wozniak 1987)

Table 2 (cont'd)

Outcome	Economic Nature	Existing Research on Magnitude
16. Social cohesion	Public	Descriptive evidence to suggest that schooling is positively associated with voting (Gintis 1971; Campbell et al. 1976) with reduced alienation and social inequalities (Comer 1988)
17. Less reliance on income (and in-kind) transfers	Private and public	More education associated with reduced dependence on transfers during prime working years (Kiefer 1985; Antel 1988; An, Haveman, and Wolfe 1993)
18. Crime reduction	Public	Some evidence that schooling is associated with reduced criminal activity (Ehrlich 1975; Yamada, Yamada, and Kang 1991)

Source: Updated and adapted from Haveman and Wolfe (1984) and Wolfe and Zuvekas (1997).

The traditional form of evaluation has focussed on market returns, particularly labour market returns, for an additional year of schooling. This focus neglects a large number of benefits (or costs) lying beyond labour market returns. By looking at the non-market impacts of education, we act upon the belief that a "full accounting must consider all of schooling's effects, positive and negative, not simply those recorded in a single market" (Haveman and Wolfe 1984, p. 379).

In Table 2, we list a number of market and non-market benefits of schooling, together with a description of existing research on the magnitude of these benefits. In general, these studies control for other characteristics such as age, race and income (where appropriate) in estimating the magnitude of schooling benefits. The first two benefits reflect the traditional measures – labour market productivity and non-wage labour market remuneration. We then shift to direct influences on other members of the household. The third impact listed is the relationship between a wife's schooling and her husband's earnings, where the table describes the positive association between the two.

The educational level of the next generation is clearly tied to the schooling of the parents (item 4). Children of parents who graduate from high school are themselves far more likely to graduate from high school than children of less well-educated parents, and parental schooling beyond the high school level increases this probability (see Sandefur, McLanahan and Wojtkiewicz 1989). Better-schooled parents appear to have children with a higher level of cognitive development as well as children with higher future earnings. There is also some evidence that living in a community in which the young adults have more education increases the probability that the children living in the community will complete secondary schooling. Complementing these estimated relationships is recent evidence that grandparent's schooling also is associated with higher levels of children's cognitive development (Blau 1999).

Increased schooling of parents, particularly mothers, seems to lead to improved health (in the form of lower infant mortality rates and lower rates of low birth weight) among infants and children (item 5). Another contribution of parental schooling is the higher rate of vaccinations among children of better educated parents. Evidence on this link also appears in studies of the effects of schooling in developing countries.

Level of schooling also seems to be related to the probability that one's child will give birth out of wedlock as a teenager (item 6). Children living with mothers who have at least a high school education appear to be significantly less likely than other children to become teen parents out of wedlock (see Sandefur and McLanahan 1990, and An, Haveman and Wolfe 1993).

For the individual, increased schooling appears related to better health and increased life expectancy (item 7). This may be due to occupational choices (choosing occupations with relatively lower occupational hazards), locational choices (electing to live in less polluted areas), more information or skills in acquiring health-related information, better nutrition, fewer health-reducing behaviours (cigarette smoking), and/or more appropriate medical care usage. The improvement might, of course, simply reflect a third factor which "causes" both more schooling **and** better health. However, the statistical relationship between the two appears quite strong. A study using sibling data from Nicaragua finds evidence in both fixed and random effect models that the relationship between more schooling and better health is not due to unobserved or unmeasured factors but instead is causal (Behrman and Wolfe 1987). While a portion of the benefit of better health is reflected in higher labour market earnings, a non-market effect is reflected in the value of better health - from reduced pain and suffering, reduced mortality, lower medical care expenditures, less time allocated to treatment of illness. Some of the benefits of better health are likely to have externalities ranging from reduced spread of contagious disease to increased utility of others (i.e. those who have other persons' health in their utility function). Some studies also indicate that one's schooling has a positive impact on the health of one's spouse (item 8).

A related benefit is the development of lifestyle habits that promote good health. Although economists are hesitant to see a causal link, a recent study suggests that persons with more schooling are less likely to smoke, and among persons who do smoke, those with more schooling smoke less per day. An additional year of schooling reduces average daily cigarette consumption by 1.6 for men and 1.1 for women.

Better educated people are also less likely to be heavy drinkers and tend to engage in more exercise per week (about 17 minutes for each additional year of schooling) than less educated people (see Kenkel 1991).

An additional benefit accruing to the "better schooled" individual is increased consumer efficiency (item 9). Michael (1982) translated the finding that a person with an additional year of schooling was significantly more efficient as a consumer into dollars of additional income. Similarly, Benham and Benham (1975), analysing only the market for eyeglasses, found that persons with more schooling tended to pay less for glasses than those with less schooling. Rizzo and Zeckhauser (1992) found that the charge per unit of time that an M.D. spent with a patient was lower for better educated individuals than for those less well educated.

Items 10 through 12 in Table 2 refer to one's success in making choices involving the labour market, marriage and family size. In all of these cases, more schooling has a positive influence, probably through gaining information that promotes more efficient decisions. Part of this gain may be simply in the ability to accomplish better matches – in the labour market, for example – but another part may be in the reduction of time spent in the search. Studies of assortative mating suggest that schooling leads to "better" choices regarding marital partners (Becker, Landes and Michael 1977). Better educated people tend to be more successful in securing desired family sizes; it is likely that more schooling enables one to gather information on how to avoid unwanted births and possibly also to reduce the probability of subfecundity. Evidence of this effect also exists for developing countries.

Beyond the gains to one's self and family are broad gains to society that may go unmeasured. There is evidence that the amount of time and money devoted to charity is positively associated with the amount of schooling one has, after controlling for income, the other primary determinant of donations (item 13). For example, one study found that college graduates volunteered nearly twice as many hours and donated 50 percent more of their income than high school graduates (see Hodgkinson and Weitzman 1988). The positive contribution to savings (item 14) has a public good aspect to the extent that the capital market is imperfect and aggregate savings are less than optimal. Greater education may lead to social cohesion and may enable one to use new technologies.[6] Persons with more schooling are likely to make more informed choices when voting, and to participate in their communities.

There are other ways in which attaining a high level of education may enhance the public good. For instance, there is evidence that more schooling is associated with a lower probability of receiving transfer benefits, either disability-related benefits or welfare (item 17). Recent analyses have found that higher education of mothers reduces the probability that their daughters will, if eligible for welfare benefits, elect to receive them. Studies of applicants for disability transfers also find that more education decreases the probability of receiving disability-related transfers. Criminal activity may also decrease as schooling increases (item 18).

All of these, then, are areas in which there has been some research on the nature of the relationship between schooling and non-market impacts, although in many cases the evidence is sketchy. Some impacts pertain to the individual and his or her family, while others relate to society. Among the largest influences are the impacts of parents' schooling on their children, particularly in terms of health, schooling, childbearing and on one's own health. Schooling also affects efficiency in consumption and the ease with which one uses new, sophisticated products, such as personal computers, or adapts to changes in the workplace. There also appear to be gains that benefit society in general, such as social cohesion and crime reduction. One is left with the impression that schooling has substantial benefits beyond those usually tabulated by measures of labour market productivity and fringe benefits. On the other hand, schooling may also have costs that are largely non-economic, such as job-related stress.

The Role of Intergenerational Human and Social Capital Transfer

The relationships identified in items 4, 5 and 6 in Table 2 concern the effect of education in one generation on the human capital and choices of people in the next generation. Most of the research on this intergenerational linkage focusses on the effects of parental schooling on the education and other indicators of attainment of their children. Two channels by which parental education affects the attainment of their children are identified: a direct effect operating through improvements in the choices and investments made by parents, and an indirect effect operating through the effect of parental schooling on the quality of the human/social capital of the neighbourhoods in which children grow up.

A large body of recent research has attempted to understand the process by which the human capital embodied in young adults is related to the education of their parents and the level of social capital present in the communities and neighbourhoods in which they grow up. Neighbourhood social capital is often identified with the average level of schooling in the neighbourhood in which youths grow up, or in the average income or occupational status of the residents of the neighbourhood. This research attempts to answer the following questions:

- Is the level of schooling of parents related to the human capital (education, probability of engaging in unproductive fertility and crime behaviours) of youths?

- Is the level of social capital in the communities in which youths grow up related to their level of human capital, again broadly defined?
- Is the level of parental schooling related to the size of the cohort of siblings with which any child grows up (and to overall population growth)?

In Table 3, we summarize the methods and findings of a large number of such studies published since 1980. The studies identified in this table provide the detail behind the patterns identified in items 4, 5 and 6 in Table 2. The data on which the studies rest, the specification of the models estimated, the independent variables included in these models, and the outcome in terms of (1) youth schooling, (2) teen nonmarital childbearing, (3) youth criminal behaviour, (4) child health, and (5) the number of siblings with which a child grows up are all summarized in Table 3. The final two columns present the estimated effects of parental education and neighbourhood human/social capital variables on these youth human capital-type outcomes.

Three criteria have guided our decisions regarding which of the many existing studies to include in our discussion. The first criterion is the quality of the studies, based on our appraisal of the data and estimation methods used. Second, all of the studies adopt an intergenerational "production function" approach to understanding the process by which youth human capital is generated, and hence reveal the patterns of non-market effects of parental education and neighbourhood human/social capital in terms of youth human capital outcomes. Finally, we have emphasized those studies that rely on longitudinal (panel) micro-data.

Several characteristics of these studies and their findings should be noted. First, the variation among the studies in the extensiveness of variables describing family characteristics and choices and neighbourhood attributes is substantial. While all of the studies listed indicate the effect of parental education on children's human capital and attainments, there is wide variation in the extensiveness of other control variables included in the studies. Third, for most of the studies in the table, we note the focus on aspects of social capital in the form of the level of education, income and occupation of the citizens that form the neighbourhood community in which children are reared.

Two dominant findings are revealed in these studies. First, a strong and positive relationship between parental education (often measured by years of schooling) and the several broadly defined human capital attributes of offspring – youth schooling, youth non-marital childbearing, youth criminal behaviour, health of offspring and youth cohort size – is revealed in virtually all of the studies. Second, there is a persistent (though not universal and often non-significant) effect of neighbourhood

Table 3

Intergenerational effects of parental human capital and neighbourhood human/social capital

Study	Data and sample	Specifications	Outcome	Control variables	Parent education variables	Neighbourhood human/social capital variables
Parental and neighbourhood human/social capital effects on youth education						
Datcher (1982)	PSID-552 male household heads ages 23–32 in 1978 who lived with parents in 1968, in SMA	OLS, race specific	Years of schooling	Family income, number of siblings, region, family receipt of welfare, parental expectations, parental efficacy/ambition, urban/rural, percentage White in neighbourhood Father's education (+; 10%)	Mother's education (+; 10%)	Average family income in neighbourhood (-; 1%)
Crane (1991)	1970 Census PUMS 92 512 16–19 year-olds (schooling) 44 466 16–19 year-olds females (teen child bearing)	Reduced form logit, race specific	Probability of dropping out of high school Probability of teenage child bearing	Family income, family head's occupational status, household structure, family size, rural origin, gender	Parents' education (+; 1%)	Percent of neighbours in managerial/professional jobs (+; 1%)

Table 3 (cont'd)

Study	Data and sample	Specifications	Outcome	Control variables	Parent education variables	Neighbourhood human/social capital variables
Haveman, Wolfe, Spaulding (1991)	PSID – 1 258 children aged 0–6 in 1968, 19–23 in 1987	Probit model	Graduated high school by 1987 = 1	Non-White, female, non-White female, father schooling, mother schooling, firstborn, head foreign born, grandparents poor, years in SMSA, parental time in pre-school years, years mother worked, no. of location moves, no. of parental separations, no. of parental remarriages, no. of other changes in family, no. of siblings, Catholic/Jewish/Protestant	Father's schooling (+; 1%) Mother's schooling (+; 1%)	NA
Clark (1992)	1980 Census-22 534 males aged 15–18 who live in SMA	Logistic regression	Probability of dropping out of high school	Age, race, ethnicity, nativity, family structure, family income, welfare use, parents' occupation, parents' labour force participation, parents' earnings, whether disabled, and parents' nativity Neighbourhood variables: SMA returns to education, SMA race-specific dropout rate, SMA percent of adults who are prof./manag, SMA percent of families with incomes > $40,000, SMA male unemployment rate, SMA percent female-headed families, SMA percent families on welfare, SMA percent individuals in poverty	Parents' education (-; 1%)	Each neighbourhood human/social capital variable is significant when entered alone in equation with extensive individual, family and SMA control variables

Table 3 (cont'd)

Study	Data and sample	Specifications	Outcome	Control variables	Parent education variables	Neighbourhood human/social capital variables
Brooks-Gunn, Duncan, Klebanov et al. (1993)	PSID-2 200 Black and White women observed ages 14–19, for schooling outcome Reduced form	Dropped out of high school Had an adolescent out of wedlock birth	Family income-needs ratio, female head, race	Neighbourhood variables: percent of families with income < $10,000, percent of families with income >$30,000, percent Black, percent of female head with kids, percent with public assistance, percent males not in labour force, 40%+ poor and **10% with families > $30,000	Mother's education (-; 1%)	Percent of neighbours in managerial/professional jobs < 5% (-; 1%)
Duncan (1994)	PSID-3 439 metropolitan teens ages 16–22 in 1968–1991; Census geocode for neighbourhood characteristics	OLS, gender and race specific	Years of completed schooling	Family income/needs ratio, percent years in mother-only family, percent income from welfare, percent years mother worked, calendar year child turned 16 Neighbourhood variables: percent Black in neighbourhood, percent female-headed families with kids in neighbourhood, percent of adult women in neighbourhood working 26+ weeks	Mother's education (+; 1%)	Percent of neighbourhood families with income > $30,000 (+; 1%) Percent of neighbourhood families with income < $10,000 (-; 1%)
Aaronson (1997)	1968–1985 PSID-2 178 individuals with a sibling at least 3 years apart in age and in respondent household for at least 2 years in adolescence		Linear probability; sibling fixed effects	High school graduation	Race, gender, household income, parental marital status, whether child worked, number of children in household, county unskilled wage rate, whether family moved	Whether father or mother graduated from high school (+; 1%)

Table 3 (cont'd)

Study	Data and sample	Specifications	Outcome	Control variables	Parent education variables	Neighbourhood human/social capital variables
Percent of neighbourhood young adults who dropped out (-; 1%) Percent of neighbourhood households in poverty (-; 5%)	Manski, Sandefur, McLanahan et al. (1992)	NLSY-2 800 males and females aged 14–17 in 1979	Probit, bivariate probit, trivariate probit, onparametric models	High school completion by age 20 = 1	Black, Hispanic, female, non-intact family at age 14, region of location, region of birth	Mother high school grad (+;1%) Mother some college (+;1%) Mother college grad. (+;1%) Father high school grad. (+;1%) Father some college (+;1%) Father college grad. (+;1%) Mother's education > father's education (+;1%)
NA	Plotnick and Hoffman (1999)	PSID 764 women who turned 26 between 1976 and 1987, with at least one sister and 1970 and 1980 Census neighbourhood information	Logistic regression; sibling fixed effects (sisters)	Obtained any post-secondary schooling	Grew up in two-parent family, region, race, family income/needs, percent of female-headed families with kids, racial composition of neighbourhood	Parents' education (+; 5%)

Table 3 (cont'd)

Study	Data and sample	Specifications	Outcome	Control variables	Parent education variables	Neighbourhood human/social capital variables
Percent of female-headed families with kids (NS) Percent of families with income < $10,000 (NS) Percent of families with income > $30,000 (+; 5%) Neighbourhood non-elderly poverty rate (NS) Percent of families receiving welfare (NS) Lillard (1993)	NLS72-4 611 males of 1972 graduating class 1970 Census of Population and Housing-zipcode (1 339) and school district (486) information	OLS	Years of college attended Years of college planned	Race, family income, ability, school quality, full-time occupation, parental education expectations, family size Neighbourhood variables: percent Mexican American in high school, percent Black in high school	Parental education (+)	Household earnings in school district (NS) Occ. spec. difference bet. mean neighbourhood earnings and national mean. (Significant for professionals/managers) Percent professionals/managers in zipcode. Percent craftsmen in zipcode (NS) Average adult education in zipcode (NS; - S) Variance in education in zipcode (NS) Percent college bound in high school (S) Number of library hours in high school (S)
	Ermisch (1999)	British household panel study (1991) sample of mothers of 666 men and 597 women and children	Ordered logit	Child's highest educational qualification	Date of birth, seven age dummies, even in a non-intact family during childhood by development state, even in a stepfamily during childhood by development stage, number of siblings, firstborn, only child, age of mother and father at birth, mother and father's part-time and full-time work by development stage, father's education, whether father is missing, whether father's work history is missing	Mother's education (+; 2%) (2% significance level for vocational degree and first and higher degrees)

Table 3 (cont'd)

Study	**Data and sample**	**Specifications**	**Outcome**	**Control variables**	**Parent education variables**	**Neighbourhood human/social capital variables**
NA	Lam and Duryea (1999)	Brazil's PNAD (1984) survey of women 30–44 years old (sample size ranged from 5 000–7 000 depending on specifications)	OLS	Schooling of 10- and 14 year-olds	Seven regions, urban, White, age at first marriage, husband's earnings	Schooling of 10 year olds: Father's schooling (+; 1%) Mother's schooling (+; 1%) (effect significant for 15/16 single years of education)
		Parental and neighbourhood human/social capital effects on youth fertility outcomes (See also Crane and Brooks-Gunn et al. above)				
NA	Duncan and Laren (1990)	PSID-1 548 Black and 2 194 White babies born between 1972 and 1985; Census geocode information on neighbourhoods	Reduced form logit	Low birth weight	Mother's age, mother marital status, mother smoking, family welfare receipt, mother's prenatal employment, poverty status of mother's family, crowdedness of mother's household, mother grew up with both parents, mother low-birth weight, region, urban/rural address of prenatal mother Neighbourhood variables: percent with public assistance, percent Black	Parents' education (-)

Table 3 (cont'd)

Study	Data and sample	Specifications	Outcome	Control variables	Parent education variables	Neighbourhood human/social capital variables
High poverty incidence significant when entered alone; disappears when background, family, and risk controls introduced		Duncan, Connell, and Klebanov (1997)	About 700 children from the 1990 IHDP; 2 464 individuals from PSID with completed schooling	OLS; "transactions model" (several variants)	IQ at age 3 Completed schooling	Family income/needs ratio, mother's age at child's birth, ethnicity, birth weight, neonatal health, gender, whether teen pregnancy Neighbourhood variables: male joblessness, family concentration, ethnic diversity
Mother's education (+; 1%)	"Low SES" (NS for both outcomes) "High SES" (S for both outcomes)	Chase-Lansdale and Gordon (1996)	1986 NLSY 673 Black and White children ages 5 or 6 who live with their mothers	Multivariate analyses of variance	Cognitive functioning at age 5-6 Behavioural functioning at age 5–6	Region, family income, number of adults in household, number of children in household, mother working, race, gender, child's age, child in school Neighbourhood variables: male joblessness, population concentration, racial similarity
Mother's education (+; 1% for cognitive devel.) (-; 5% for behaviour probs.)	Neighbourhood SES (S for cognitive and internalizing behaviour but "wrong" sign for behaviour)	An, Haveman, and Wolfe (1993)	PSID: 872 females aged 0–6 in 1968 and older than 21 in 1988	Bivariate probit model	Out-of-wedlock birth, ages 13–18 = 1	Black, any religion, no. of years in SMSA, county average unemployment rate, average state welfare generosity, no. of siblings, mother's age at first birth, mother out-of-wedlock birth, no. of household location moves, no. of parental separations, no. of parental remarriages, predicted average welfare ratio, parental welfare recipiency

Table 3 (cont'd)

Study	Data and sample	Specifications	Outcome	Control variables	Parent education variables	Neighbourhood human/social capital variables
Parental and neighbourhood human/social capital effects on youth criminal behaviour						
Mother high school graduate (-) 1%	"Bad" neighbourhood (NS)	Case and Katz (1991)	NBER Survey of Youth, 1989-1 200 youths aged 17–24, in low-income Boston neighbourhoods	OLS; Probit	Any crimes omitted last year, use illegal drugs, single-parent status, idle, high school dropout, attend church often, friendship with gang members	Presence of mother and father at age 14, parents' years of schooling, parental marital status, mother a teen at child's birth, family member drug and alcohol use history, family member in jail, family church attendance, age, gender, race; behaviour/outcome variables of neighbour youths (defined as youths who are in the same and adjacent neighbourhoods, and in the survey) matched to own outcomes Parents' education (NS, most
Parental human capital effects on child health						
outcomes) Use illegal drugs (+; 1%) Parent idle (-; 10%)	Most outcome-matched neighbourhood behavioural characteristics are significant and "right" signed	Strauss (1990)	World Bank's LSMS and the Ministry of Finance in Côte d'Ivoire, 447 children under 6 years living in 154 households in rural villages	Fixed effects	Height and weight-for-height standardized	Child age, male child, mother's height, mother's age, child of senior or junior wife, interaction of distances (to doctor, to nurse, to primary school) with mother's education

Table 3 (cont'd)

Study	Data and sample	Specifications	Outcome	Control variables	Parent education variables	Neighbourhood human/social capital variables
Weight-for-height outcome: Father's education (+; 10%) Mother's education (+; 20%) (without interactions)	NA	Thomas, Strauss, and Henriques (1991)	Brazilian Demographic and Health Survey (1986) on 1 306 children aged 5 or less and their mothers (794 women) in northeast Brazil	OLS; 2SLS	Child height standardized	Income: partner and total household income, literacy: mother: semi-literate and literate, information usage: mother regularly listens to radio, watches TV and reads paper Community covariates: preschools and primary schools per thousand, student:teacher ratio for both Health establishments: without specialists per capita and beds per facility, and with specialists per capita and beds per facility Infrastructure: proportion buildings with and without piped water, with electricity, central sewage, septic tank, rudimentary sewage, public garbage disposal; and population
In rural northeast: mother's education (+; 1%) (not significant when controlling for mother's information) In urban northeast: mother's education (+;	1%) partner's education (+; 1%) (not significant when controlling for mother's information)	NA	Glewwe (1999)	Morocco's Enquête nationale sur le niveau de vie des ménages (1990-91) of 1 495 households with children age 5 or younger	OLS; IV; community fixed effects; 2SLS with fixed effects	Height for age

Table 3 (cont'd)

Study	Data and sample	Specifications	Outcome	Control variables	Parent education variables	Neighbourhood human/social capital variables
Sex, age, age squared, mother's height, father's height, mother's schooling, father's schooling, rental income, children overseas, irrigat-	ed crop land, unirrigated crop land, tree crop land Arabic, French, math, mother's health knowledge, mother's ability to read a	medicine box Mother's schooling outcome: OLS estimate (+; 1%) Fixed effects (+; 5%)	NA	King and Hill (1993)	United Nations' WISTAT and the World Bank's UNESCO and WHO datasets of 152 countries, 1960–1985	OLS
Infant mortality (deaths per 1 000 births)	Female/male enrolment ratio, GNP, total population, population per physician, percentage of population with safe water, 17 regions of the world		Female enrolment (-; 1%)	NA	Lam and Duryea (1999)	Brazil's PNAD (1984) survey of 33 457 women 30–44 years old whose first birth was at least 1 year and 5 years before survey
Parental human capital effects on family and cohort size						
Probit	First child's survival at age 1 and 5	Seven regions, urban, White, age at first marriage, husband's earnings	Child's survival to age 5 outcome: Father's schooling (+) (significant at the 5% level for 10/16 single years of schooling) Mother's school-	ing (+) (significant at the 5% level for 8/16 single years of schooling) NA	Lam and Duryea (1999)	Brazil's PNAD (1984) survey of 13 519 women 30–34 years

Table 3 (cont'd)

Study	Data and sample	Specifications	Outcome	Control variables	Parent education variables	Neighbourhood human/social capital variables
OLS	Number of children born by age 30	Seven regions, urban, White, age at first marriage, husband's earnings	Father's schooling (-; 1%) Mother's schooling (-; 1%)	NA	King and Hill (1993)	United Nations' WISTAT and the World Bank's UNESCO and WHO datasets of 152 countries, 1960–1985 OLS
Total fertility (number of children)	Female/male enrolment ratio, GNP, total population, population per physician, percentage of population with safe water, 17 regions of the world		Female enrolment (-; 5%)	NA	Schultz (1994)	Summers and Heston, FAO country surveys, 1991 World Development Report, from 68 low-income countries in 1972, 1982 and 1989 OLS; fixed effects

Glossary

AFDC-Aid to Families with Dependent Children
FAO-Food and Agriculture Organization
IHDP-Infant Health and Development Program
LSMS-Living Standards Measurement Studies
NLS72-National Longitudinal Surveys, 1972
NLSY-National Longitudinal Survey of Youth
PNAD-Pesquisa Nacional de Amostra de Domicilios
PSID-Panel Study of Income Dynamics
PUMS-Public Use Microdata Samples
SMA-Statistical Metropolitan Area
SMSA-Standard Metropolitan Statistical Area
UNESCO-United Nations Educational, Scientific, and Cultural Organization
WHO-World Health Organization
WISTAT-Women's Indicators and Statistics

human and social capital variables on youth human capital in the form of schooling, non-marital childbearing, and criminal behaviour.

On Estimating the Value of Non-Market Impacts of Education

In order to translate these benefits into guidance for public-sector decisions on allocation of resources to education, it would be useful to be able to value the full set. Haveman and Wolfe (1984) have developed a method to estimate the marginal value of schooling. This method exploits the relationship (derived from economic theory) between schooling and marketed inputs in producing non-market outcomes. Existing studies that establish a relationship between education and a non-market outcome such as health, consumer efficiency, education attainment of children, and so forth, can be used with this method to generate estimates of the marginal value of schooling. Each of these studies must have a coefficient estimate relating schooling to the outcome of interest, as well as control for other additional variables likely to be associated with that outcome. In addition, each study must include another input which has a market value to the non-market outcome of interest. Examples of marketed inputs include physician visits, spending on police in the community, private music lessons, and so forth. When such inputs are not available, income is used under the assumption that income will be spent on the output only until the marginal product per dollar spent is equal to that of other inputs including schooling. The coefficient on income then represents the marginal product of income spent on the outcome under study.

We present a simplified version of the Haveman-Wolfe model to illustrate the method, using a single non-market good. The model makes the standard economic assumption that individuals or households efficiently combine schooling with other market inputs to produce the non-market outcome. A well-known result in economics is that efficient producers will equate the ratio of the marginal product to input price, across all inputs. This relationship also holds in the production of the non-market outcome, with schooling and at least one other marketed input. That is,

$$\frac{MP_{SCH}}{PS_{CH}} = \frac{MP_X}{P_X} \tag{1}$$

where MP_{SCH} is the marginal product of schooling in producing the non-market outcome, MP_X is the marginal product of any input X with market price P_x, and P_{SCH} is the implicit price or willingness to pay for additional schooling in producing the non-market outcome. A little rearranging yields the following formula for computing the implicit price or willingness to pay for additional schooling in producing a non-market outcome:

$$P_{SCH} = \frac{MP_{SCH}}{MP_X} \times P_X \qquad (2)$$

This equation for the implicit value of additional schooling is intuitively appealing. If the marginal products of schooling and the other input are equal, the implicit willingness to pay for schooling will be equal to the price of the other input. If the marginal product of schooling is double that of the other input, the implicit value of schooling is twice the unit price of the other input.

The extension of the simple model presented here to the production of multiple non-market and market outcomes, such as wage income, is straightforward and is fully developed in Haveman and Wolfe (1984). To compute the total willingness to pay for additional schooling across all non-market and market outcomes, one simply sums the implicit willingness to pay in producing each individual outcome.[7]

Implementing this method involves estimating the productive relationship (MP_{SCH}) between schooling and each outcome. It also requires estimating the productive relationship (MP_X) between each outcome measure and another input. The latter input should be one that is competitively marketed. Once these marginal productivities are estimated, they are combined with the private cost of the privately purchased input in order to estimate the implicit willingness to pay for additional schooling for each outcome, using the formula given in Eq. 2. The implicit value for each individual outcome can then be summed to produce the total incremental value of additional schooling.

We use this approach to generate estimates of the value of non-market impacts in Table 4. We converted a small number of impacts into the marginal relationship or further into a willingness-to-pay estimate, basing our results on coefficients obtained from the studies listed in the third column of the table. We do this for cognitive development of children, consumption efficiency, own health, reduction in criminal activity and charitable giving (volunteer hours).

For example, a recent study by John Ermisch (Ermisch and Francesconi 2000 and special tabulations, 1999) provides estimates of the impact of mother's education and household income on the level of schooling achieved by their children (output 4 in Table 2) in the UK, using data drawn from the British Household Panel Study. The coefficient estimate for household income (the input with market values) is 0.098 (t-statistic = 1.668) for girls indicating that, at the margin, an additional dollar of household income is positively related to the expected level of schooling. Mother's education is represented by dummy variables for six levels of schooling, ranging from less than O level to first and higher (with no qualification as the omitted category) in an ordered logit estimation. The simulation of the effects of mother's education and family income (at the youngest age which they

Table 4

Estimates of the annual value (willingness to pay) or impact of additional schooling

Outcome	Value or impact	Source of coefficients
Cognitive development of children	$350 in family income for high school diploma (vs. no diploma) and $440 for some college (vs. high school diploma).	Angrist and Lavy (1996)[1]
	$860–$5,175 per year in future family income for an additional year of schooling.	*Murnane (1981)[2]; *Edwards and Grossman (1979)[3]
	£1,166–£1,727 in family income for mother's educational attainment of vocational/first and higher degrees.	Ermisch (1999)
	$4,008 in permanent family income for an increase in 4.8 years of grandfather's schooling; $2,692 in permanent family income for an increase in 3.6 years of grandmother's schooling.	Blau (1999)
Consumption efficiency	$290 in household income for an additional year of schooling. Save approximately $5.50 per pair of eyeglasses for an additional year of schooling.	*Michael (1975); *Benham and Benham (1975)[4]
Own health	$8,950 in increased net family assets for an additional year of schooling.	*Lee (1982)
	1.6 (1.1) fewer cigarettes smoked per day men (women) for an additional year of schooling. Thirty-four more minutes of exercise per 2 weeks.	Kenkel (1991)[5]
	1.85 (1.25) (1.37) greater relative risk of death from heart disease, those with 8–11 years of schooling compared to those with 12 or more, males 45–64 (65–74) (females 65–74).	Feldman et al. (1989)[6]
Reduction in criminal activity	$170 reduction in per capita expenditure on police for an additional mean year of schooling in community.	*Ehrlich (1975)
Volunteer hours	$51 for males per year; $30 for females per year.	Freeman (1997)

Sources:

* Table 2, Haveman and Wolfe 1984, p. 396. All other values and impacts estimated by authors based on coefficients in studies listed in third column of table. All values in 1996 dollars except as noted.

[1] Based on National Longitudinal Survey of Youth (NLSY) (Table 8, column 4 estimates).

[2] Based on measurement of cognitive development on Iowa Test of Basic Skills using children in Grades 3 to 6 whose families participated in the NIT experiment in Gary, Indiana. For conversion, see Haveman and Wolfe (1984).

[3] Based on data from cycle II of the Health Examination Survey using mean of estimated value of mother's and father's education.

[4] Based on 1970 Health Interview Survey (HIS): n = 10 000, of which 1625 obtained eyeglasses in 1970.

[5] Based on 1985 Supplement to the HIS on Health Promotion and Disease Prevention; n = 14 177 males and 19 453 females.

[6] Based on 62 405 persons in Matched Records Study, Whites only.

observe it, mainly around age 16) on the distribution of daughter's qualifications is 0.218 for a mother's vocational degree on the probability that the daughter will have a vocational degree, and 0.255 for a mother's first or higher degree on the probability of the child having a vocational degree, while the relationship of family income to a vocational degree is 0.187. Using the formula of Eq. 2, we derive the marginal value of a mother's vocational degree on the probability that the daughter will have a vocational degree, in terms of annual family income as follows:

$$P_{VQM}=\frac{MP_{VQM}}{MP_{Y}}\,x\,P_{Y}=\frac{.218}{.187}\,x\,£1000=£1166$$

This translates into a pound value of £1,166. The pound value of a mother's first or higher degree on the probability that the daughter will have a vocational degree, in terms of annual family income, is £1,364.[8]

These estimates are provided only to illustrate a possible procedure for valuing non-market effects of schooling. In Haveman and Wolfe (1984), the authors conclude that a conservative estimate of the value of non-labour market influences is "of the same order of magnitude as estimates of the annual marketed, earnings-based effects of one more year of schooling" (pp. 400–401). Given the growing evidence on the non-market effects of schooling, including intergenerational and social capital effects, this assessment seems likely to hold, indicating again that traditional estimates of the market returns to schooling fail to capture the full social return to education.

Notes

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[2] These include Haveman and Wolfe (1984), Michael (1982), McMahon (1997) and Wolfe and Zuvekas (1997). A recent volume by Behrman and Stacey (1997) discusses a variety of sources of these non-market effects.

[3] Traditionally, the amount of schooling provided has depended heavily on the public sector. In the cases of elementary and secondary education, public colleges and universities, and public subsidies, the price charged tends to be far below the marginal cost of schooling.

[4] http://nces.ed.gov/pubs99/digest98/d98t412.html.

[5] Canada's expenditures for higher education dropped from $10,182 per pupil in 1990 to $7,701 in 1994 (constant 1995 US dollars.) http://nces.ed.gov/pubs2000/digest99/d99t418.html.

[6] Wozniak (1987) argues that "early adopters [of new technology] must acquire and process a better quality and larger quantity of information than others" (p. 104). His results on a group of farmers provide some evidence that "increases in education enhance innovative ability" and that with "an additional year of schooling the likelihood of (...) being an early adopter increases by about a percentage point (or about 3 percent)" (p. 107).

[7] Haveman and Wolfe's fully developed model accounts for the non-exclusivity (non-divisibility) of schooling in producing multiple outcomes.

[8] Similarly, the simulated value of a mother's vocational degree on the daughter's first or higher degree is 0.107, and that for a mother's having a first or higher degree on her daughter achieving the same degree is 0.152. In this case, family income has a simulated relationship of 0.088 providing economic estimates of mother's additional schooling of £1,216 and £1,727, respectively (both mother's levels of schooling are statistically significant at the 1 percent level). These point estimates of the value of additional schooling, and those shown in Table 4 should be interpreted with caution given the large standard errors on some of the relevant coefficients.

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12

Three Hypotheses About Community Effects

J. Douglas Willms[1]

Introduction

The development of a "learning society" has been viewed as synonymous with developing a "knowledge economy," and considered critical to employment and sustained economic growth (Becker 1993). The argument is that societies derive economic and social benefits by investing in people. Investments in education, health and nutrition increase the "human capital" of a society, which is gauged by the knowledge, competencies and health of its members (Alexander 1997). Education, both formal and informal, is usually considered foremost, because it is closely related to the skills and cumulative learning that are relevant to the production of goods, services and ideas in the marketplace. During the past decade, theorists have stressed that learning societies depend also on **relationships among people**, both within communities and organizations, and among them. They have invoked the term "social capital" to embody the nature of relationships among people, and how these facilitate collective action, the strength of social networks, and the norms and values of a community (Coleman 1988). Questions about institutions and organizations have been concerned with whether their policies, rules, routines, and organizational and structural features contribute to increased teamwork, better communication, the sharing of knowledge and ideas, and an acceptance of the norms and values consistent with their goals. Similarly, questions about communities have been concerned with the nature of social support and collective action, and how these affect people's trust and trustworthiness and their sense of security and well-being.

Aside from the problems associated with the definition and measurement of social capital, which have been discussed by others in this volume, there are several problems confronting any assessment of the impact of social capital on social outcomes. First, social capital has to do with relationships among people in some "community," such as a school, workplace, neighbourhood, or some larger jurisdiction. To make any progress, a researcher must specify the units of analysis, and in some way define "community." But any definition of community is easily challenged. Indeed, the notion that social capital embodies networks suggests that the boundary of what people call their "community" itself depends on their stock of social capital. Moreover, every individual participates in multiple and overlapping communities (e.g. family, neighbourhood, workplace, sports teams, church group).

Second, even when community is narrowly defined, as a school or workplace for example, it is rarely feasible to randomly assign individuals to communities. Moreover, social capital is undoubtedly correlated at the community level with the aspects of economic and human capital which are known to affect social outcomes, and all of these forms of capital are correlated with demographic characteristics of the community. It is not unreasonable to presume, for example, that a school serving students from affluent families would tend to have a relatively high level of material resources, a particularly well-educated staff, and a relatively strong social network among its students, parents and staff. In statistical terms, selection bias is exacerbated by the presence of confounding variables.

Third, it may be that the important aspects of social capital do not vary much among communities within a larger jurisdiction (e.g. a province or state), but when one shifts to examining its effects at a higher level of analysis (e.g. among states or provinces within a country, or among countries), the number of potential confounding variables multiply, and the correlations among them become even stronger.

Fourth, the "treatment effect" associated with possessing social capital probably varies for different types of individuals. For example, social capital may be particularly important for individuals who possess relatively little economic and human capital, in some way compensating for their relative disadvantage.

Fifth, the causal direction is unclear, and may also interact with the type of individual: for some people, social capital may help them gain access to better jobs and schooling; for others, wealth and access to better schooling may help them develop and strengthen their social capital.

Finally, social capital may have latent effects. For example, many children have to cope with economic hardship and inadequate family support, yet some of these vulnerable children go on to have successful marriages and working careers. Studies of resilient children have suggested that a relationship with a strong mentor during childhood is one of the most important factors contributing to resiliency (Werner and Smith 1982).

This paper sets out three hypotheses relevant to differences among communities in their social outcomes, and the relationships between individuals' social outcomes and their socio-economic status. It presents some of the recent evidence pertaining to these hypotheses, and argues that they are central to an understanding of how social capital affects social outcomes. The three hypotheses can be embodied in a multilevel framework, and there are powerful statistical models for testing them (Bryk and Raudenbush 1992; Goldstein 1996). In discussing the evidence pertaining to these hypotheses in the fields of education and health, I identify some of the processes used to explain community differences, and argue that these may be a much better proxy for social capital than "trust" or "the size of people's social networks," which have been used in macro-level analyses. Finally, I speculate as to how social capital might contribute to the distribution of social outcomes, and discuss the implications of this research for conducting large-scale studies that could contribute to our understanding of the role of social capital.

The first of the three hypotheses, the "Hypothesis of Community Differences," is straightforward: it posits that communities differ in their social outcomes, even after account is taken of people's socio-economic status. The second hypothesis is concerned with the relationship between social outcomes and socio-economic status, which are referred to here as socio-economic "gradients." The "Hypothesis of Converging Gradients" holds that gradients vary among communities, and that they converge at higher levels of socio-economic status. Consequently, successful communities are those that have been successful in bolstering the social outcomes of their least advantaged citizens. The "Hypothesis of Double Jeopardy" holds that people from less advantaged backgrounds are vulnerable, but people from less advantaged backgrounds who also live in less advantaged communities are especially vulnerable.

The examples presented here pertain mainly to the distribution of literacy skills prior to full participation in the labour market: during the period of formal schooling, and among youth aged 16 to 25. The term "literacy" is used in a very broad sense, as it is in the International Adult Literacy Survey (IALS) (OECD and Statistics Canada 1995), to describe an individual's ability to: "us[e] printed and written information to function in society, to achieve one's goals, and to develop one's knowledge and potential" (p. 14). It entails the ability to read and comprehend written materials, including reports, documents, and mathematical charts and displays; to use that information to solve problems, evaluate circumstances and make decisions; and to communicate that information verbally and in writing. Thus, literacy is not viewed as a dichotomy of literate versus illiterate, but a skill continuum. Findings from the IALS suggest that a person's position on that continuum has dramatic implications for his or her economic success, health and well-being (OECD and Statistics Canada 1995; HRDC, OECD and Statistics Canada 1997). In our study of differences among communities, we tend to focus on quantitative literacy. We prefer it for three reasons. First, it is more closely related to the effects of schooling per se, whereas literacy skills in the language arts are more strongly affected by family background. Second, quantitative literacy is closely related to the acquisition of high-paying jobs and long-term employment, and the demand for technically skilled workers is likely to increase (OECD 1995). Third, differences in quantitative literacy skills among jurisdictions with different languages cannot easily be dismissed as being attributable to the difficulty level of the tests associated with their translation.

Although literacy skills are normally thought of as a form of human capital, their acquisition has important implications for social capital: they must certainly affect the nature of the social networks in which people are included and engaged, and the extent to which people can transform social capital into economic capital. Moreover, compared with other social outcomes, literacy may have a particularly strong relationship with social capital. People become members of social networks by learning the language of the culture, and using it to engage in social relations.

Hypothesis of Variation Among Communities

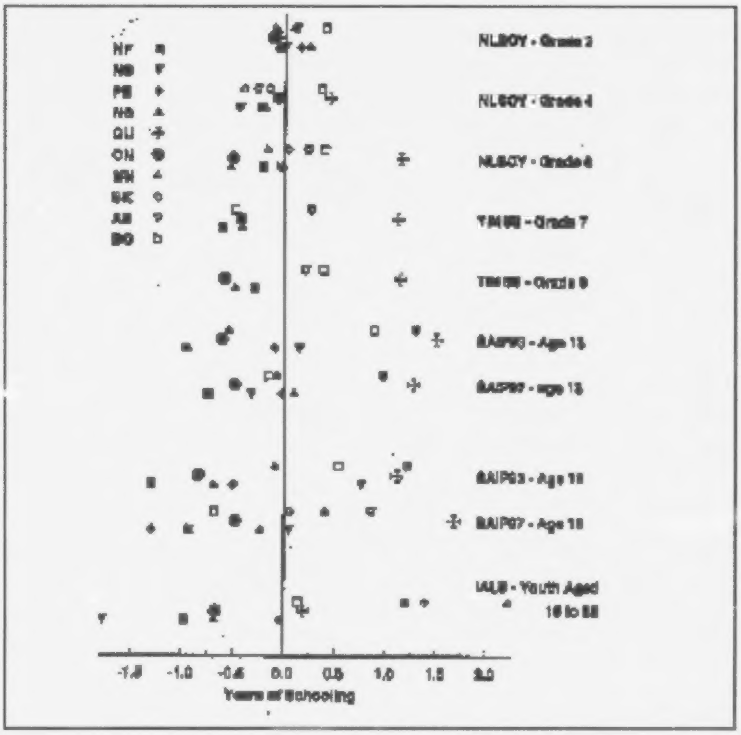
The first hypothesis asks whether communities vary in their outcomes, after taking account of individuals' socio-economic status and other characteristics. A useful starting point, however, is to ask first "To what extent do communities vary in their outcomes?" In our research at the Canadian Research Institute for Social Policy, we have been concerned with the extent to which provinces vary in their academic achievement (Willms 1996; Frempong and Willms, forthcoming). Canada is an interesting case study in this respect, because there is no national governmental body responsible for education. The federal role is limited to transfer payments to the provinces, which jealously guard their constitutional jurisdiction over education. The calculation of transfer payments, until recently, pertained only to post-secondary education, and now do not refer even to this level of education (Dupré 1996). In most respects, therefore, each province operates its own education system.

There have been some attempts by the Council of Ministers of Education, Canada (CMEC) to monitor performance at the national level, and provide comparative data. Frempong and I have assembled these data, and data from three national and international studies, to discern whether provinces do indeed vary in their achievement scores, and to estimate the extent of variation among communities within provinces (Frempong and Willms, forthcoming). The data were garnered from the first wave of the *National Longitudinal Survey of Children and Youth* (NLSCY) (Statistics Canada and HRDC 1995); the

Third International Mathematics and Science Study (TIMSS) (Beaton et al. 1996), and the IALS (OECD and Statistics Canada 1995). Although each of these studies has limitations with respect to the assessment of the distribution of literacy skills, together they provide a useful portrait of successful schools and schooling systems in Canada. To better compare the findings across studies, we attempted to scale the achievement variable in a "years-of-schooling" metric; for details, see Frempong and Willms (forthcoming). Figure 1 presents a summary of our findings pertaining to interprovincial variation in mathematics achievement.

Figure 1

Interprovincial differences in mathematics



When children enter school, there is considerable variation in their cognitive capacity, and their potential to benefit from formal schooling – what is often loosely called "readiness to learn." Analyses of children's receptive vocabulary at ages four and five suggest that much of this variation is among schools (and communities defined in other ways) within provinces, and relatively little variation is between provinces (Willms 1999a). However, by the end of Grade 2, the variation among provinces, at least in mathematics results, is discernible and statistically significant. Moreover, the extent of variation among provinces increases as children progress through the schooling system. The results for Quebec are particularly intriguing: it clearly emerges as the top-performing province by the end of Grade 4, and it maintains its advantage through to the end of secondary school. In contrast, Ontario, which is Canada's largest and most affluent province, anchors the bottom end of the distribution. The figure also depicts a widening east-west divide: as children progress through the system, British Columbia and the three Prairie Provinces tend to have scores that are above the national average, while the average scores of the four Atlantic Provinces fall below the national average.

Some of the differences among the Canadian provinces in their quantitative literacy skills have been evident for nearly two decades (Willms 1996). They are not attributable to variation in children's socio-economic backgrounds or their race or ethnicity; in fact, controlling for socio-economic status and minority status yields estimates of an even wider gap between Ontario and Quebec. Understanding why these differences persist is clearly relevant to the economic growth and well-being of Canadians. But they also have an important lesson for the study of human and social capital:

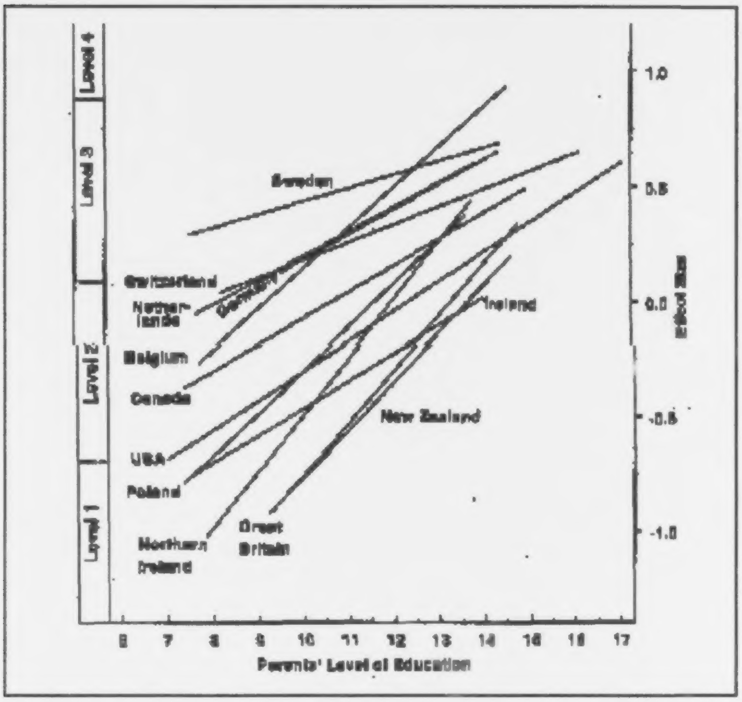
The formation of human and social capital begins early. These results indicate that we can identify successful communities as early as the second grade. We believe that at least some, and perhaps a large proportion, of the variation among jurisdictions is rooted in the early years, and determined by the ability of communities to develop children's literacy skills during the period from conception to age 5 (McCain and Mustard 1999).

Hypothesis of Converging Gradients

Figure 2 displays the socio-economic gradients for youth aged 16 to 25, for quantitative literacy skills across the 12 countries that had participated in the IALS by 1997 (adapted from Willms 1998, 1999b,c). Figure 3 displays the results for 11 US states and the 10 Canadian provinces. The outcome measure in both analyses is quantitative literacy: the left-hand Y-axes display the "levels" of IALS literacy scores, with the scale used in the international reports. The right-hand Y-axes display the skills levels as effect sizes; that is, as a fraction of a standard deviation.[2] The level of education of the youths' parents is on the X-axis, expressed in years of schooling. The figures display the regression lines of literacy scores on parental education for each jurisdiction

Figure 2

Quantitative literacy scores for youth aged 16–25
International Adult Literacy Survey, 1994



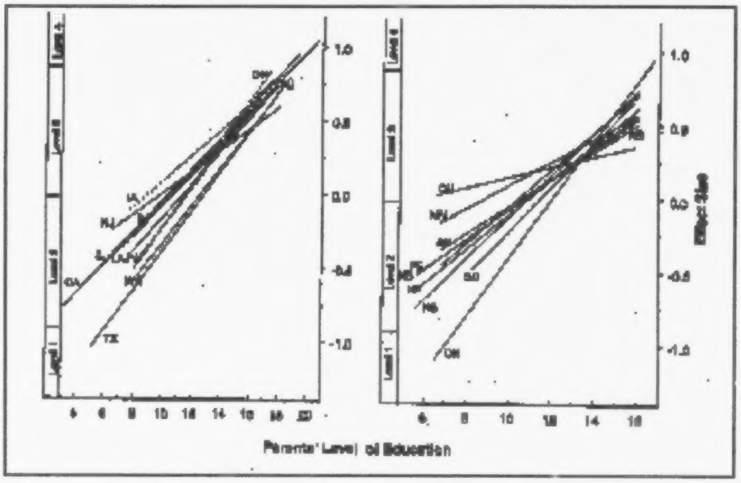
(country, state, or province), with each line drawn to encompass the range of parents' education, from the 10th to the 90th percentile for each jurisdiction.

The results in Figure 2 show clearly that countries vary considerably in both their levels of literacy scores, and in their socio-economic gradients. But perhaps more important, at least with respect to the discussion on social capital, is that the gradients converge at higher levels of socio-economic status: there is a strong inverse relationship between the level of skills for a country and its socio-economic gradients. This means that youth from relatively advantaged backgrounds tend to have high literacy scores in every country, whereas the average levels of skills of youth from less advantaged backgrounds vary considerably among countries.

The same is true of states within the US, and provinces within Canada (Figure 3). In this analysis, there was also a relationship

Figure 3

Relationship between quantitative literacy scores and parents' education (adjusted for sex, immigration status and ethnicity)



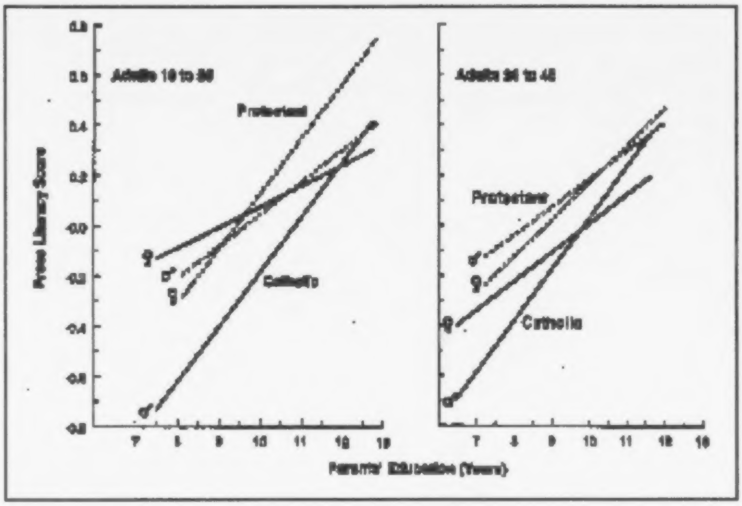
between gradients and latitude: states that were further north tended to have shallower gradients and higher scores (Willms 1999b). Also, the gaps between minorities and non-minorities in literacy scores were smaller in more northerly states. The results indicated that some of the inter-jurisdiction variation was attributable to the amount of time youth spent watching television, rather than participating in literacy activities at home and at school.

In other research based on the IALS, I examined differences in the socio-economic gradients for Catholic and Protestant adults in Northern Ireland (Willms 1998). The results indicated large disparities in the skills of Protestants and Catholics, associated mainly with the relatively low literacy skills of Catholic males. The disparities were smaller for youth aged 16 to 25 than for older adults. If we can assume that these differences reflect secular changes in the educational experiences of youth in the two sectors over the past two decades, rather than some interaction between sector and age effects, it seems that the relative improvement of Catholics has been attributable to a flattening and a raising of the gradient for Catholic females, whereas the gradients for Catholic males has remained low and flat (see Figure 4).

As a result of these and other analyses, I maintain that the hypothesis of converging gradients is worth testing to achieve a better purchase on the nature of human capital formation and the role of social capital. In some situations, we have found that the hypothesis cannot

Figure 4

Sector differences in Northern Ireland in prose literacy scores International Adult Literacy Survey, 1994

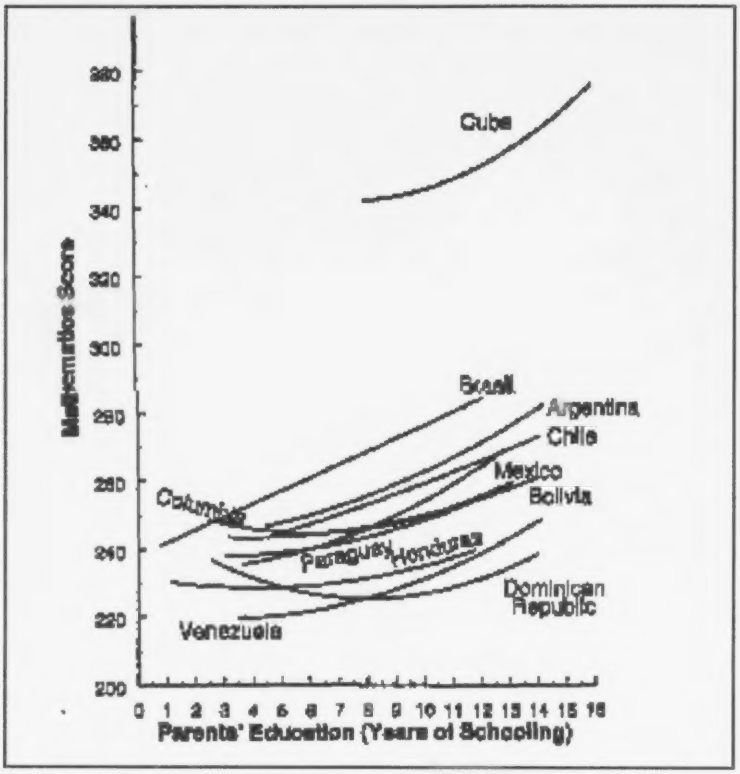


be rejected. For example, I examined the gradients in literacy skills for youth in Poland across 49 administrative areas (Willms 1998). The results indicated that these local communities varied substantially in their literacy skills, but the hypothesis of converging gradients did not hold. Similarly, Marie-André Somers and I have examined the socioeconomic gradients in reading and mathematics scores for 11 countries in Latin America (Willms and Somers 1999). Here also, countries varied in the level of their performance, but the gradients did not converge. We did find, however, that the gradients in some countries were non-linear, and that there appeared to be a "premium" associated with completing secondary school. The results for mathematics are shown in Figure 5.

Before encountering the Latin American results, I had concluded that "the success of a society, as gauged by these types of indicators, depends on the extent to which it is successful in reducing inequalities" (Willms 1999b, p. 31). It may be that societies progress from relatively flat gradients, with low levels of social outcomes, to steep gradients with average levels of outcomes, and finally to shallow gradients with high levels of social outcomes, and that progression depends on how social and human capital are invested. Nevertheless, both the examples and the counter-examples provide evidence that it is possible to achieve both high levels of social outcomes and equality

Figure 5

Socio-economic gradients for mathematics scores, for 11 Latin American countries



of social outcomes among low- and high-status groups. The research indicating that gradients do converge in some cases has important implications for how we think about social capital:

- There are social, economic and historical factors associated with the culture of a society which shape and constrain people's behaviours in ways that determine its socio-economic gradient. Thus, raising and flattening gradients may be a difficult and long-term process.
- We require a better understanding of the structural and contextual features of societies and local communities that lead to greater equality. In high-income countries, success depends on investments in human and social capital which

improve the social outcomes for its most vulnerable citizens.

Hypothesis of Double Jeopardy

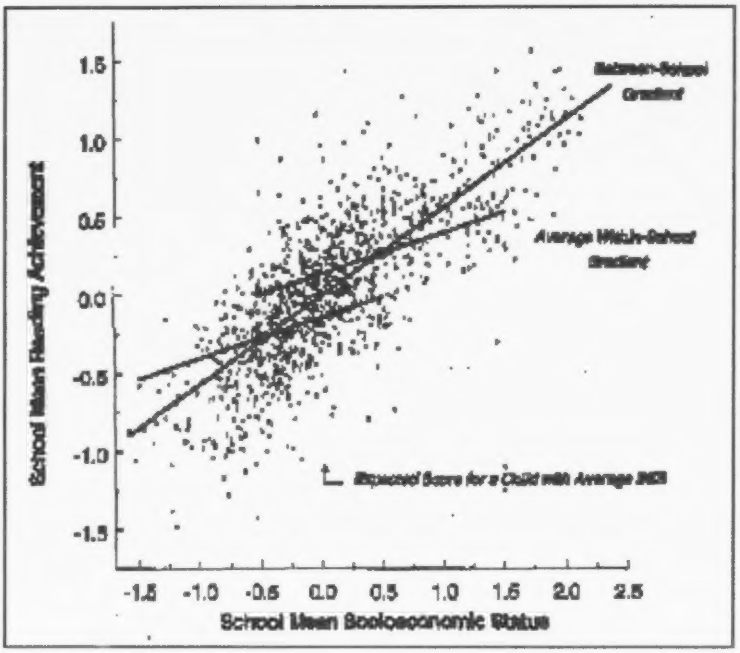
Research on schooling in several countries has suggested that there is a contextual effect associated with the demographic characteristics of a classroom or school, over and above the effects associated with an individual's family background. Generally, it indicates that while there is a positive effect associated with an individual's socio-economic status, there is also a positive effect associated with the socio-economic status of the school to which the individual belongs. This occurs when the average gradient **within** communities is shallower than the overall gradient **between** communities.

Figure 6 provides an example. It shows school mean reading achievement plotted against school mean socio-economic status for nearly 1000 schools that participated in the U.S. National Educational Longitudinal Study. The heavy black lines indicate the between-school gradient and the average within-school gradient. Schools that scored above this line, on average, were performing better than expected, given the socio-economic status of the students they served, whereas schools that scored below this line were performing worse than expected. The average **within-school** gradient is somewhat shallower. It has been depicted for two schools which are on the between-school gradient; that is, two schools which were not performing particularly well, or particularly poorly, given their socio-economic intake. Note that the expected score for a child with nationally average socio-economic status (a score of zero on the X-axis) is higher in the school with the higher average socio-economic status. The "effect size" in this case is approximately one quarter of a standard deviation (Ho and Willms 1996). In this example, the effect is similar for students with low or high socio-economic status – on average both advantaged and disadvantaged students achieved better results when they attended schools with high average socio-economic status.

The "Hypothesis of Double Jeopardy" holds that people from less advantaged backgrounds are vulnerable, but people from less advantaged backgrounds who also live in less advantaged communities are especially vulnerable. There is strong evidence that this hypothesis holds for school achievement when children are segregated, either **between schools** through residential segregation or by the "creaming" of the most able pupils into selective schools (e.g. private schools or charter schools) (Summer and Wolfe 1977; Brookover et al. 1978; Henderson, Mieszkowski and Sauvageau 1978; Shavit and Williams 1985; Rumberger and Willms 1992), **between classes** through tracking or streaming (Willms 1985; Kerckhoff 1986, 1993; Willms 1986; Gamoran 1991, 1992), or **within classes** through ability grouping (Rowan and Miracle 1983; Sørenson and Hallinan 1984; Dar and Resh 1986; Dreeben and Gamoran 1986; Slavin 1987; Willms and Chen

Figure 6

School mean reading achievement versus socio-economic status for US Grade 8 students



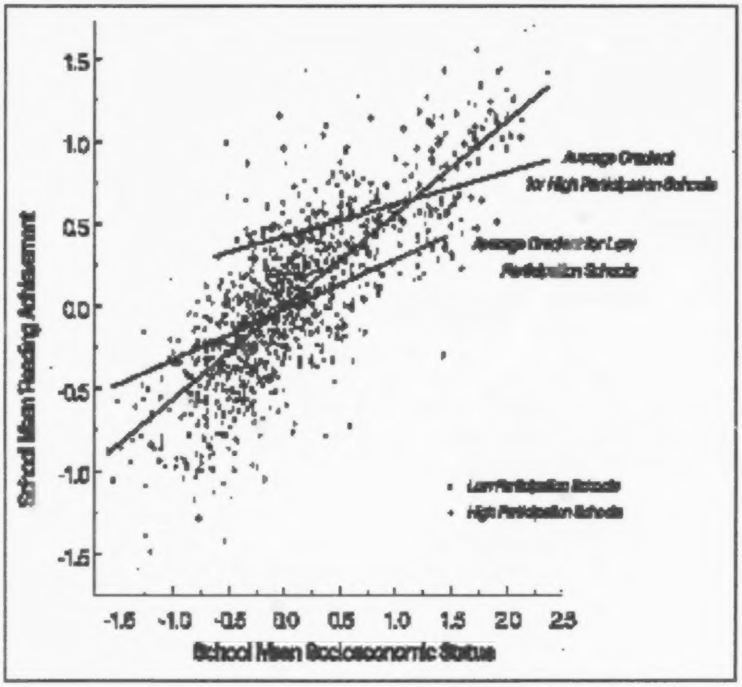
1989): children from advantaged backgrounds do better, while those from disadvantaged backgrounds do worse. Whether the contextual effects associated with school mean socio-economic status tend to be stronger for low socio-economic groups than for high socio-economic groups is still an open question, but in cases where there is an interaction between school mean socio-economic status and individual-level socio-economic status, it suggests that disadvantaged students fare worse. Consequently, segregation seems to be especially harmful for disadvantaged students – thus the term, "double jeopardy."

Sui-Chu Ho and I examined whether contextual effects were partially mediated by parents' involvement in school. We used data from the National Educational Longitudinal Study to construct measures of parental involvement in school. Figure 7 portrays one of our findings. It displays the same set of schools as those shown in Figure 6, except that schools which had relatively high levels of parental involvement (the top 10%), as gauged by their participation in school governance and as volunteers, are denoted with crosses. Similarly, schools with relatively low levels of parental involvement are denoted with solid circles. The average within-school gradients for each set of schools – that is, those with low and high parental involvement – are depicted separately. The figure illustrates three important findings: (1) the schools with high levels of parental involvement tend to be high socio-economic status schools, and vice versa; (2) parental involvement has an overall positive effect on achievement (this is evident by comparing schools which have a mean socio-economic status near the national mean); and (3) the gradients tend to be shallower in high involvement schools than in low involvement schools. Thus, increased parental involvement in the school seems to not only raise achievement levels, but also flatten the gradient.

If we consider parental involvement in school as a potent form of social capital, these cross-sectional findings illustrate two important points with respect to the formation of social capital:

Figure 7

The effects of parental involvement on school mean reading achievement



- when people are segregated, either within or between communities, it is difficult for them to generate social capital
- in communities where there is a high level of social capital, outcomes are improved and inequalities are reduced.

A Multilevel Framework for Testing the Three Hypotheses

In most cases, the hypotheses presented in the examples above have been tested formally using multilevel regression models. Multilevel modelling, or hierarchical linear modelling (HLM), is a particular regression technique designed to take into account the hierarchical structure of nested data, such as when students are nested within schools, patients within hospitals, or citizens within communities (Bryk and Raudenbush 1992; Goldstein 1996). An assumption underlying traditional regression approaches is that the observations are independent; that is, the observations of any one individual are not in any way systematically related to the observations of any other individual. This assumption is violated, for example, if some of the observed subjects are from the same family, or, as in the examples above, from the same schools or communities. The use of traditional approaches usually yields biased estimates of the relationships among variables, and standard errors that are too small.

Multilevel modelling also provides a useful framework for incorporating aspects of human and social capital at more than one level. For example, when individuals participate in social clubs and form networks, this social capital may lead to a collective action that affects all members of a community, but it may also contribute to improving individuals' efficacy and sense of belonging, resulting in increased participation at home and at work. Multilevel models provide a structure for thinking about such effects at different levels, and a means for testing relevant hypotheses. In educational research, researchers used to debate whether the student, the classroom or the school was the appropriate level for analysis. But they realized that this was the wrong question, and called for techniques that explicitly modelled the multilevel structure of the data (Cronbach, Deken and Webb 1976; Burstein 1980). This "level-of-analysis" problem has been solved through advances in statistical theory and computing, and now computer programs that can be used to analyse multilevel data are widely accessible. With respect to social capital and its effects on sustained economic growth and well-being, these methods allow us to explicitly model different forms of social and human capital, conceptualized and measured at different levels of aggregation to estimate their effects on individuals' social outcomes. In this section, I present the multilevel models pertaining to the three hypotheses described above.

"*Hypothesis of Community Differences.*" The first hypothesis asks whether communities vary in their outcomes after taking account of individuals' socio-economic status. In a multilevel formulation, a separate regression model is fit to the data for each community:

$$Y_i=\beta_0+\beta_1X_i+\varepsilon_i \qquad \text{Within-Community Equation (1)}$$

where Y_i is a person's outcome score, X_i is the person's score on some covariate, such as socio-economic status. The parameter β_1 is the regression slope, or what has been referred to above as the socio-economic gradient. It is an estimate of the expected change in the outcome score Y for a one-unit change in X. The intercept, β_0, can be thought of as the expected outcome score for a person who has a score of zero on X. In most multilevel models, X_i is "centred" on a particular value, such as the national mean, so that a value of zero on X refers to a hypothetical person with a particular set of characteristics. The parameters, ε_i, are the residuals; that is, the deviation of each person's score from the regression line. When we have j different communities, we can write j such equations:

$$Y_{ij}=\beta_{0j}+\beta_{1j}X_{ij}+\varepsilon_{ij} \qquad \text{A Set of Within-Community Equations (2)}$$

where the subscript j has been added to each element. Thus, we now have a set of j different β_0's, one for each community, and j different β_1's. Note that the β_0's represent the expected score for a person with average background in each community, and the β_1's are the socio-economic gradients.

The β_{0j}'s are expressed as an average β_0 plus the deviation of each community from that average:

$$\beta_{0j}=\Phi_{00}+U_{0j} \qquad \text{Among-Community Equation for Levels of Outcome (3)}$$

where Φ_{00} is the grand mean, or the mean of the community means, and U_{0j} is the deviation of a community's mean from the grand mean. Although it is conceptually easier to think about multilevel models as having within- and between-community equations, the estimation of multilevel models entails the substitution of Eq. 3 into Eq. 2 to produce an equation with both individual- and community-level residuals. Such equations can be easily fit with available software.

The hypothesis of community differences posits that communities vary in their average scores, after taking account of individuals' family background. Thus, in this formulation, the hypothesis in its null form is:

H_0: Var(U_{0j})≠0 Hypothesis of Community Differences (4)

"*Hypothesis of Converging Gradients.*" In the same way, the socio-economic gradients, that is, the β_1's, are expressed as an average β_1 plus the deviation of each community's gradient from that average:

$\beta_{1j}=\Phi_{01}+U_{1j}$ Among-Community Equation for Socio-economic Gradients (5)

where Φ_{01} is the mean of the within-community gradients, and U_{1j} is the deviation of each community's gradient from the mean gradient. A test of converging gradients requires that there are statistically significant differences among gradients, which is expressed in null form as:

H_0: Var(U_{1j})≠0 Hypothesis of Community Difference in Gradients (6)

The hypothesis of converging gradients posits that there is a negative correlation between the intercepts and gradients, which is expressed as a test of the statistical significance of the covariance (or correlation) between the U_{0j} and the U_{1j}:

H_0: Cov(U_{0j},U_{1j})<0 Hypothesis of Converging Gradients (7)

"*Hypothesis of Double Jeopardy.*" The hypothesis of double jeopardy is about the effect of group-level characteristics. In the sociology of education, the "contextual effect" has traditionally been operationalized as the group mean socio-economic status, $\bar{X}_j$. This is entered into the multilevel model at the second level by extending Eq. 3:

$\beta_{0j}=\Phi_{00}-\Phi_{01}\bar{X}_j+U_{0j}$ Among-Community Equation with Contextual Effect (8)

where Φ_{00} is the intercept indicating the average β_{0j}, after adjusting for $\bar{X}_j$, Φ_{01} is an estimate of the "contextual effect" of group mean socio-economic status, and U_{0j} are the group-level residuals, referred to as the residual parameters. The hypothesis of double jeopardy is concerned with whether Φ_{01} is statistically significant (i.e. at least twice its standard error). A test of whether the "contextual effect" varies for people with differing socio-economic status is achieved by also including $\bar{X}_j$ in the model for the gradients:

$$\beta_{1j}=\Phi_{10}+\Phi_{11}\overline{X}_j+U_{1j} \qquad \text{Among-Community Equation for Gradients with Contextual Effect (9)}$$

where Φ_{11} indicates the effect of the interaction between individual-level socio-economic status and group mean socio-economic status.

Specifying the Effects of Social Capital. Questions about the effects of social capital can be specified in this framework by extending either the individual-level model, or the models regarding intercepts or slopes. An important consideration is whether the construct represents an individual-level of community-level phenomenon. Consider parental involvement: if parents are involved in their child's education at home, by reading regularly to the child or helping with homework, for example, one would expect their efforts to bolster their child's achievement. Thus, a variable denoting parental involvement at home, measured at the individual level, would be added to the within-school model (Eq. 2). The hypothesis would be that the coefficient for this variable would be positive and statistically significant, and would explain some of the variation in the individual-level residuals; that is, reduce Var(ε_{ij}). We would also expect that it would partially explain variation among communities, resulting in a decrease in Var(U_{0j}). We might also hypothesize that the effect of parental involvement is greater for children of lower socio-economic status, and enter it alongside an interaction term (parental involvement by socio-economic status) at the individual level. If this were the case, we might also see a reduction in the correlation between intercepts and gradients.

But parental involvement at school, such as volunteering in the classroom or participating in school governance, is likely to have an effect primarily at the level of the classroom or school. In this case, we could operationalize the construct as the percentage of parents participating, and enter it as a community-level variable in Eqs. 3 and 5. The coefficient for this variable in Eq. 3 would indicate whether parental involvement had a significant effect on achievement, over and above the effects associated with individual students' socio-economic status; the coefficient for parental involvement in Eq. 5 would indicate the effects of parental involvement in mediating the gradients. This is precisely the model fitted by Ho and Willms (1996), and presented graphically in Figure 7 above. The effect of mean participation on the adjusted school means (i.e. Eq. 3) was 0.08 of a standard deviation; its effect on socio-economic gradients (Eq. 5) was -0.056, indicating shallower gradients at higher levels of participation.

Evidence of Community Effects Relevant to Social Capital

Education

The concept of social capital has received considerable attention and some empirical analysis in the field of education. Glenn Loury used the term as early as 1977 to capture aspects of family and community resources which bolster children's academic and social development (Loury 1977). Prior to his seminal 1988 article, Coleman and his colleagues used the concept to explain differences in achievement between the public and Catholic schools (Coleman, Hoffer and Kilgore 1982, Coleman and Hoffer 1987). He believed that Catholic schools outperformed public schools because there were higher expectations for achievement, especially for minority and disadvantaged students, stemming from the religious doctrine that all children were precious in the eyes of God (Coleman 1990). Catholic schools were also deemed effective because the parents and staff all knew each other - a construct he called "social closure" - and the parents knew their children's friends - called "intergenerational closure" - which reinforced norms and encouraged student learning. Later, Coleman (1990) elaborated the concept of social capital to include aspects of social structure that enable individuals to realize their interests.

The role of social capital in educational research has been heavily influenced by the work of Annette Lareau (1989), who integrated social capital with the concept of cultural capital (Lamont and Lareau 1988), as elaborated by the French sociologist Pierre Bourdieu (Bourdieu 1977). Her thesis was that schools are middle-class institutions with middle-class rules, organizational structures and communication patterns. Parents who possess a knowledge of high-status culture, and a disposition toward certain linguistic and social competencies (i.e. Bourdieu's cultural capital) are comfortable relating to teachers and participating in the life of the school. Thus, middle-class parents are more likely to achieve social closure. Similarly, middle-class children possess the "cultural capital" that enables them to appreciate the curriculum and adapt to school life. Lareau (1989) found that middle-class parents of first-grade children were more likely to be involved in their child's schooling than working-class parents.

Consequently, empirical studies of the effects of social capital have emphasized the role of parental involvement, and the notion of social closure (Carbonaro 1988, Morgan and Sørenson 1999). Morgan and Sørenson (1999) found that the social closure of parents within the public sector had a **negative** effect on children's learning gains in mathematics, after controlling for the density of children's networks. They distinguished between **norm-enforcing** schools, consistent with contemporary definitions of social capital, and **horizon-expanding** schools. The latter were characterized by parents and other adults using information available in their social networks. They constructed two variables to measure this construct: one denoting the extent to which parents worked together to support school policy, and another indicating whether parents had adequate say in school policy. They found that these two variables had significant positive effects supporting the notion of horizon-expanding schools. Although they tested their models in a multilevel framework, as described in the previous section, they did not try to discern the effects of their social capital constructs on socio-economic gradients.

Carbonaro (1998) attempted a direct assessment of the concept of intergenerational closure, using data from the National Educational Longitudinal Study. His measure of closure described the extent to which parents knew the parents of their children's friends. He found significant positive effects of closure on staying in school, and on learning gains in mathematics, but not on gains in reading, history or science. The effect on learning gains in mathematics diminished when the measures of parental communication and participation constructed by Ho and Willms (1996) were added to the model, and became statistically insignificant when four measures describing students' absenteeism, skipping of classes, suspensions and association with friends who had dropped out of school were added. Together, these results provide modest support for the effects of social closure. Perhaps what is particularly important is that it revealed a close connection to more direct measures of parents' investment of time and energy in their children's schooling.

If we are to understand the role of social capital on children's development, we need to understand how it relates to some of the more proximal variables affecting children's achievement. An important point, relevant to the hypothesis of community differences, is that most of the action is at the classroom level. For example, in a study of children's schooling outcomes in New Brunswick, I partitioned an array of schooling outcomes into district, school, classroom and student-level components. The majority of variation was among students within classrooms, which is consistent with several studies of school effectiveness. However, for every outcome measure examined, there was considerably more variation among classrooms within schools, than among schools or among school districts. For example, 7 percent of the variation in mathematics scores was among classrooms, compared with only 4.7 percent among schools and 1.8 percent among school districts. The results for reading, science and writing scores indicated even greater variation among classrooms and less variation among schools. The same results were evident for affective outcomes describing children's self-esteem, sense of belonging, general well-being and general health. Thus, in trying to understand the role of social capital, we might look first at classroom "communities."

Research on schooling that has emphasized the importance of the learning environment in the classroom has identified several factors relevant to the role of networks and norms. A review of this literature by Scheerens (1992) identified "structured teaching" and "effective learning time" as the most important factors. These two aspects of successful schools are captured by the term "academic press," which is used in the literature to describe schools where principals and teachers project the belief that all students can master the curriculum (Anderson 1985). Their high expectations are manifest in a number of teaching practices and school routines, including homework practices, the content and pace of the curriculum, and how time and resources are used in the classroom (Anderson 1985; Dreeben and Gamoran 1986; Plewis 1991).

The research has also emphasized the importance of parental involvement, as discussed in the examples above. However, apart from Carbonaro's work, there has been little emphasis on the role that social capital might play on children's behaviour. One of the most significant factors associated with classroom achievement is the disciplinary climate of the classroom (Willms and Somers 1999), but usually this is treated as having to do with the teacher's management skills, rather than peer networks or parents' support of school norms. Also, we know relatively little about how social capital is distributed in segregated schooling systems, such as those where there is tracking or streaming.

Researchers have not paid much attention to variation among schools in their socio-economic gradients, or the hypothesis of converging gradients. Lee and Bryk (1989) found that US secondary schools differed significantly in their socio-economic gradients, and in the achievement gap between minority and non-minority students. They attributed the variation to various aspects of academic organization, including the extent to which schools differentiated students into various course-taking patterns. Small schools with less differentiation, on average, had shallower gradients. Alan Kerckhoff and I used hierarchical linear models to estimate the socio-economic gradients for 148 Local Education Authorities (LEAs) in the UK, based on data from the National Child Development Study (NCDS) (Willms and Kerckhoff 1995). We found significant positive effects associated with lower pupil:teacher ratios and less selective LEAs, but these factors were unrelated to socio-economic gradients. In our analysis of the Canadian TIMSS data, Frempong and I found that classrooms varied significantly in their socio-economic gradients. Higher achievement was found in classrooms where there was less ability grouping and smaller class sizes (Frempong and Willms, forthcoming). We found a significant but modest negative correlation (-0.14) between adjusted levels of achievement and gradients. To summarize, there is strong evidence that gradients vary among classrooms, schools and school districts, but there have been only a few efforts to test the hypothesis of converging gradients at various levels of the schooling system. One of the problems is that it is difficult to achieve a powerful enough research design to discern why gradients are steep or shallow in certain classrooms or schools.

Researchers have devoted considerable effort to testing the hypothesis of double jeopardy, because it is relevant to questions about how students are allocated to schools, classrooms and instructional groups. There is unequivocal evidence that the average socio-economic status of a child's class or school has an effect on his or her outcomes, even after taking account of (individual-level) ability and socio-economic status (Summers and Wolfe 1977; Brookover et al. 1978; Henderson, Mieszkowski and Sauvageau 1978; Rowan and Miracle 1983; Sørenson and Hallinan 1984; Shavit and Williams 1985; Willms 1985, 1986; Dar and Resh 1986; Dreeben and Gamoran 1986; Kerckhoff 1986, 1993; Slavin 1987; Willms and Chen 1989; Gamoran 1991, 1992; Rumberger and Willms 1992). Sociologists have attributed contextual effects to peer interactions, and one could easily extend the idea to stress the importance of social capital. I have a relatively simple explanation. Suppose that roughly one quarter of the students in a community are vulnerable because of cognitive or behavioural problems. If one segregates the majority of these students into one side of the system through residential segregation, streaming, special programs for gifted students, or charter schools and private schools, then for teachers in that side of the schooling system, about one half of their students (about 12 to 15 students in classes with 24 to 30 students) will have special needs. In such circumstances, it is more difficult to effectively use support from parents, maintain high expectations, establish a positive disciplinary climate, and have positive student-teacher interactions - all of the factors embodied in the concept of social capital.

Health

Recent research on health outcomes has provided convincing evidence that people's health status varies significantly among countries, among states and provinces, among health authorities and among neighbourhoods (Duncan, Jones and Moon 1993; Kaplan et al. 1996; Wilkinson 1996, 1992; Hart, Ecob and Davey Smith 1997; Boyls and Willms 1998; Wolfson et al. 1999). The health of societies is related to overall levels of income and wealth, but what is striking is that health status is also related to the level of income inequality in a society (Kaplan et al. 1996; Wilkinson 1992, 1996; Wolfson et al. 1999). Underlying this finding is the notion that a feeling of relative deprivation leads to poor health. Consistent with this hypothesis is that people who have demanding jobs, but little control over the processes of their work, are at greater risk of disease (Syme 1996). Researchers have also emphasized the importance of social integration, especially being married or having close friendships if one is unmarried, and the quality of social support (House, Williams and Kessler 1987; Orth-Gomer, Rosengren and Wilhelmsen 1993; McLanahan and Sandefur 1994; Furstenburg and Hughes 1995; Seeman 1996). Thus, greater emphasis has been placed on the quality of social relationships than the size or structure of social networks.

An important aspect of the socio-economic gradient for health outcomes is that it appears to be curvilinear. In the US, for example, an increase in income is associated with markedly better health outcomes for adults earning less than $20,000 annually, but above this threshold, income has a weak relationship with health status (Epelbaum 1990; House et al. 1990; Mirowsky and Hu 1996). The income gradient in Canada is also curvilinear, but the rate at which the effects of rising income diminish is not as pronounced (Boyle and Willms 1998; Wolfson et al. 1999). Researchers have also shown that health status is related also to levels of education and literacy, and have argued that these probably serve as alternative resources for income in affecting health status (Mosley and Cowley 1991). Sen has noted that this is especially important in low-income countries, where levels of maternal literacy affect life expectancy at birth and the health of newborns (Sen 1993).

Curvilinear gradients, and the effects that income inequalities have on the distribution of health outcomes somewhat complicate the hypotheses of converging gradients and double jeopardy. Researchers have not systematically examined gradients in a multilevel framework to discern whether gradients rise more sharply for low-income adults in some communities than in others. However, there is strong support for the converging gradient hypothesis at the macro level, based on data for Sweden and the UK. Vagaro and Lundberg compared the death rates and socio-economic gradients for men aged 20 to 64 in the UK (England and Wales only) and Sweden (Vagaro and Lundberg 1989). Swedish men had considerably lower death rates than British men at all levels of social class, and, consistent with the hypothesis of converging gradients, the differences in death rates between Sweden and the UK were more stark at lower levels of social class. Results pertaining to infant mortality rates in the UK and Britain revealed a similar relationship (Leon, Vagero and Otterblad Olausson 1992).

Concluding Comments

There are at least six themes running throughout this paper relevant to our understanding of how social capital might affect sustained economic growth and well-being. First, it is a multilevel problem. Social capital is about **relationships** among people, and these directly affect the distribution of social outcomes at the micro level. Thus, before we can make much progress at the macro level, we need to understand how investments in social capital affect the social outcomes of individuals within the family, classroom, workplace and neighbourhood. But social capital is also about **collective actions** derived from relationships, and these affect the distribution of social outcomes at micro and macro levels. Bringing the two perspectives together requires a multilevel framework. Second, children's outcomes during the early years are the foundation of social and human capital for a society. Differences among communities in children's cognitive and behavioural outcomes can be discerned as early as age 7, and probably earlier. We need a better understanding of how investments in social capital can be used to strengthen this foundation. Third, successful societies are those that are successful in improving the social outcomes of their most vulnerable citizens. We need a better understanding of how investments in social capital are related to raising and flattening socioeconomic gradients. Fourth, the segregation of people along social class lines, or among racial and ethnic groups, affects the distribution of social outcomes. Given that social capital is about relationships among people, we need a better understanding of how it is formed and used in segregated and desegregated societies. Fifth, the **quality** of social relationships appears to be more important than **quantity**. An understanding of the role of social capital requires an assessment of how social networks affect the **processes** that are proximal to social outcomes, such as social integration, social support, family functioning, intergenerational closure and micro-level personality variables (e.g. self-efficacy and self-esteem). Sixth, social capital is embedded in the culture of a society, and, therefore, affected by social, economic and historical factors. Achieving some purchase on the effects of social capital will require us to incorporate these factors into analyses. Progress in this vein would likely be furthered by assessments that enable us to understand how social capital and its relationship with social outcomes are distributed geographically within and between communities.

The macro-level analyses of the effects of social capital on economic growth and well-being have used rather crude indicators of social capital, such as "trust" and "transience," and have been based mainly on data aggregated at a macro level (e.g. states and countries). My concern is that such indicators are highly correlated at these levels with other constructs that could give us a better purchase on how social and human capital affect economic growth and well-being. If we believe that social networks and collective actions affect social outcomes by increasing social support and social integration, or by reducing alienation and giving people a greater sense of control, then these are the constructs we need to measure. Moreover, the macro-level analyses do not capture the important processes at the levels of family and community where social capital is invested and transformed into other forms of capital that bear on social outcomes.

I believe that there are several ways that the OECD and its member countries can strengthen their large-scale assessments and monitoring programs to address this issue. Most of these are not expensive. First, we require an integrated set of longitudinal surveys which cover the life span from conception to old age. We are close to this in Canada with a set of about four or five longitudinal surveys being conducted by HRDC and Statistics Canada. Second, we need studies that also track "communities," defined in different ways. For example, consider the Programme of Indicators of Student Achievement (PISA), an OECD study of 15-year-old youth that will be conducted this year in over 30 countries. Canada is integrating this study with its Youth-in-Transition Study (YITS), thereby creating a longitudinal study that is anchored in an international study. There is an opportunity for a sample design which sampled "communities" (geographically defined) at the first stage, and schools and students within those communities. When the next wave of PISA data is collected three years hence, we would want to select our sample of 15-year-old youth from the same communities. This would not only enable us to examine levels and gradients at the level of community, we could also discern the stability of these estimates. This can be achieved by fitting multilevel models that extend the models presented in this paper by incorporating time as an element (Willms and Raudenbush 1989). These could give us a powerful purchase on the effects of social capital because they would allow us to ask whether **changes** in intercepts and gradients are related to **changes** in social capital, at the level of local communities. I do not believe that such modifications would be particularly expensive, and would not unduly compromise the accuracy of provincial or national estimates. Third, we need to better integrate geography into our analyses. In virtually all of the research on school effectiveness, we have treated schools as independent entities, without attention to their relationship to other schools in the community. I believe we could make a giant leap forward in this area if we had sufficient geographical data to conduct two kinds of analyses. One involves incorporating geography into the analysis to estimate spatial auto-correlation. The second entails estimating regressions at the local level to assess the extent of spatial non-stationarity, essentially by fitting a regression model separately within each local area (Fotheringham, Charlton and Brunsdon 1997). For example, imagine the power of a map of Canada and the US which displayed the relationship between social capital and health status, adjusted for socio-economic status, across local areas. Fourth, we need to think harder about opportunities for natural experiments and case studies that borrow strength from and build upon the findings of our large-scale studies. For example, given the large disparities in mathematics achievement between Quebec and the rest of the country, I am curious whether these differences would be evident if we compared schools in close proximity but on opposing sides of the

Quebec-New Brunswick and the Quebec-Ontario borders. Over-sampling these schools would enable a more powerful analysis, but we would probably learn more through case studies of particular communities.

Notes

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[2] The data were scaled on the full international sample, such that the mean score was zero, and the standard deviation was 1.0. The relationship between literacy scores and respondents' level of education suggests that an effect size of 0.15 of a standard deviation is roughly equivalent to one additional year of schooling (Willms 1998).

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Commentary

Gunnar Eliasson

The range of material presented in this session was much wider than I expected. There are some very daring approaches and, overall, enjoyable papers. Given this, the most challenging task of the editor and the organizers of the symposium must be to bring all this material together into a coherent whole. I will try to contribute something here. First, a common conceptual framework is needed that takes you down to the micro level and embodies sufficient dynamics to serve as building blocks in a model of economic growth. It does not have to be a formal model. That would be impossible. But the conceptual framework must be helpful in interpreting all the formal models presented in this session in a coherent fashion. This is, in fact, not as demanding as it sounds, and it really must be considered an urgent task for economists to address. But you must then, I repeat, begin at the micro level (this is my argument) and then link upwards to macro and policy parameters. In fact, why not start with a micro version of Marshall's industrial district. If you allow dynamic agents to populate Marshall's essentially static industrial district (his problem was to accommodate increasing returns in the Walrasian system), you will have what you need to endogenize economic growth. If you start with Marshall's original static story and aggregate, you will come up with new growth theory. Thus, Marshall's analysis of industrial economics problems would be a very useful starting point for integrating the seemingly very disparate papers of this session and of this conference. This was the argument of my paper for this conference so I cannot resist repeating it here.

Most of the models presented are, in fact, micromodels, with two or three macro ones. My first argument is that if you aggregate to the macro level, you leave the level where economic behaviour and dynamics occur, where the entrepreneurial initiatives are taken and where individuals have to cope with unpredictable change in their environments. This is where both **human** and **social** capital are needed. All this washes out with aggregation and you wind up relating aggregates to one another that cannot even be expected to be stable. Given the micro studies presented in this session, you do not have to be satisfied with macro-econometrics. Furthermore, the details of the micro studies presented should be useful in interpreting (or maybe reinterpreting) the results of the macro studies. I will illustrate how. The interesting Wolfe and Haveman paper can be very useful for such reinterpretations.

Walter McMahon's model applies new growth theory to a variety of countries. It is typical macro, and there is no other way at this stage to do international comparisons. Serge Coulombe's model is especially interesting because it covers the provinces of Canada in an integrated fashion. Some aspects of this model, in fact, relate directly to a number of the micro studies presented at this conference. Both models feature catch-up or convergence properties in the long run. The way the models are formulated I would, however, expect to see convergence in the very long run by prior assumption. For instance, regarding Coulombe's model, in all the estimates he finds that growth relates negatively to the initial level of income; that is, part of the convergence property of the model. My question for Serge is: To what extent is this result there by prior assumption or is it an empirical result that depends on the fact that only Canadian provinces have been studied, a result that might have come out differently with a different set of provinces? What would have happened if you had plugged in a California-type economy in Canada? What will this model tell us about the New Economy that many expect is emerging out of new technology and California-type entrepreneurship? I find these questions interesting because the answers really have to be looked for at the entrepreneurial micro level of the economy. The macro relationships only measure ex post outcomes, and they may be in error if the econometric model specification forces convergence on the data.

Now, introduce the notion of a Marshallian industrial district and allow the entrepreneurs in it a free play. The positive sum game implied in the new growth theory model will require competence on the part of actors and be a tough environment for all. It becomes natural to distinguish between **human** capital moving the entrepreneurs and leading firms and individuals in a competitive game on the one hand, and some other kind of capital, embodied in individuals and the environment, supporting the individuals in their attempts to cope successfully with the consequent unpredictable and arbitrary change. Let us call that other kind of capital **social capital** and proceed to characterize it. It obviously has something to do with welfare and distribution.

Douglas Willms observes (in his paper) that successful countries or communities have been successful in bolstering the social outcome of their least advantaged citizens. I am not exactly clear what he means by that. It would suggest that maybe we should use a different measure of growth than the standard one used by Willms. This is necessary if we are concerned about the distribution and its consequences, something recognized explicitly in Osberg and Sharpe's paper for another session of this conference. Walt McMahon also looked at distribution, but indirectly. He studied a number of distributional outcomes in terms of their indirect effects on the growth outcome, but he did not look at them as the final outcome itself.

Knowledge matters critically in all papers. Knowledge is commonly assumed to be the outcome of schooling or education. Hence, it becomes natural to plug educational inputs (notably, measured formal education) into the macro model. However, if you do not explicitly model the ways education is transferred into useful human and social capital you easily come out with very strong policy implications that are not empirically correct. Schooling is what really matters; such is the standard argument. Hence, more money for schools will boost educational production functions and solve all economic and social problems. Educators and policy makers in the past arrived very rapidly at that conclusion and it was based on solid econometric evidence from not well-specified macro models. Let us look carefully at some micro evidence presented in the interesting Wolfe and Haveman paper which demonstrates that schooling influences a lot of dimensions of the human character and that some of these dimensions feed back on the incidence of schooling itself. What does this mean for the interpretation of macro models that cannot be explicit on the dynamics of human interaction with the formal schooling system, and for policy? It may not even be clear that more schooling is what you need, even though this may appear to be the conclusion from macro models.

I found the Wolfe and Haveman paper about the non-market benefits from school very useful for model reinterpretations of this kind, besides being very enjoyable reading. They observe that public schooling accounts for up to 7 percent of Gross National Product (GNP) in some of the countries, and much less in other countries. This means that school is a dominant resource user in some countries, notably the wealthy industrial countries. I would add here that education properly defined is much more than formal education, including informal education, parent upbringing and on-the-job training and learning, including very large resources devoted to the corporate classroom. So, essentially, a lot of valuable time and other resources are being spent on education, in schools proper, on the job, and all throughout the life cycle of an individual. What Wolfe and Haveman did not consider is that early schooling develops a "platform" that makes further learning more efficient, and that this is another non-market benefit of public schooling. We use the concept of a platform for further learning and intellectual retooling at my department at the Royal Institute of

Technology (KTH) in Stockholm to study the effects of more or less well-organized lifelong learning. We know from a number of studies that you get more access to education and training on the job if you have a good platform for learning to begin with. The better that platform the more profitable you become, as an object for educational and training investments and for your access to on-the-job training resources. Thus, education is very important for the overall allocation of both educational resources and competence in the economy. That is an important economic and social benefit, which I think should be included in the discussion of non-market benefits of education. I should also repeat that education, hence, draws considerable resources. It, therefore, becomes important to understand how the output of school is composed (the product) and produced. The whole issue about the product of school is something that I would like to read more about in Bob and Barbara's paper. The way they relate their results to a number of non-market benefits should make it possible to tell a lot more about the way schools should be organized.

Also, there could be some sort of underlying third selection factor in this kind of results, because people with particular qualities receive more years of schooling; we have seen that in some other studies. Another point argued in Douglas Willms's paper is the importance of family life. Bob and Barbara mention in their paper that education has to begin early on. It has to begin with the parents, perhaps even in the previous generation, because of the long time needed to build, for instance, attitudes. An appropriate question to Barbara and Bob should be: "Should kids be removed from bad family environments?"

The story does not end here. In fact, health appears to be the critical factor explaining the level of education, the ability to learn, the ability to hold a job, overall income and, thus, the distribution of income.

Douglas Willms's three hypotheses were very interesting, especially the implications they have for patterns of spending on education, and on the allocation of competence in the economy. Much of the investment in general schooling comes from public spending. What does this mean for the under- and over-investment hypothesis? If I remember it correctly, Psacharopoulos, in one of his studies, concluded that there was over-investment in higher education and under-investment in primary and secondary education, so maybe society would benefit from shifting resources to the lower end. His results come from data from the developing economies, but the current discussion in the rich industrial economies on the state of education and the usefulness of very long education suggests that a further inquiry into these matters might turn out interesting and controversial results. Essentially, perhaps that shift could go all the way to the family level, somehow making sure that kids get a good family background. That is one conclusion I believe Willms's paper leads to. Even though we may be principally against such authoritarian approaches to family life, we should remember that they have been practised within and around the former Soviet empire. Even Sweden had a spell of those ambitions, especially around the 1940s, with results that do not look good today.

Finally, there is Steven Knack's paper on trust. It belongs to the category of papers attempting to measure the impossible, but his results are useful because they raise important problems; in this case, the importance to build trust in the country, or a good reputation that lowers transactions costs in the economy. This policy task is similar to the ambitions of firms to develop a brand name, the value of which is in fact measured in the stock market. This branding problem at the national level is a fact of life and a very acute problem in the formerly planned economies trying to develop a market economy.

Finally, back to the measurement (of capital) problem. The result emerges that individuals need a particular own capital or societal infrastructure capital to be capable of coping with unpredictable and arbitrary change in their local environments. Such unpredictable change comes out as a theoretical result when you leave the intellectual domains of the static neoclassical model and shift your attention to a dynamic version of Marshallian economics, or what I prefer to call an **experimentally organized economy**. In this theoretical economy, which is much closer to the real economy than the neoclassical model, you need human capital to cope with the unpredictable change and "insurance" broadly defined. This alone is a good reason to introduce a narrowly defined social capital which is both embodied in the individual and part of the institutional infrastructure of the economy and that supports the individual socially in weathering change in his or her "arbitrary environment." I do not argue that this is all there is to social capital, but to me it makes sense to begin with something that can be fairly well defined and that is measurable in a sense similar to human capital before the difficult task of measuring the impossible is attempted.

Richard Harris

In this session, there are five papers which cover a wide range of issues and evidence which bear on the general theme of social capital. As we have learned in the symposium, the concept of social capital is an extraordinarily rich one, but also one that appears to be subject to multiple interpretations. Whether the concept is useful for classification and measurement or not ultimately depends upon how it is used. The papers in this session demonstrate both the weaknesses and strengths of the concept of social capital. Many people associate the term with the original Putnam notions of trust and association. This leads to a certain restriction in the way the concept is both used and measured. For most of the papers in this session, however, a somewhat broader interpretation is used. For economists, there is a distinct blurring between the concept of social capital and other concepts such as human capital, neighbourhood effects or simply education. My general impression is that empirical work in the area will probably be advanced by the use of more restrictive definitions of social capital. Nevertheless, the papers of this session all bear in one way or another upon social capital and its role in economic growth and development.

The McMahon paper is most closely related to the traditional concept of human capital. The paper presents an estimated dynamic model of the interactions between education, economic growth, and a number of social outcome variables such as inequality, environmental quality and political stability. The model is estimated using a panel of OECD countries. The economic module is distinguished by the presence of an educational externality in an otherwise traditional Lucas-style growth model. The non-economic outcomes variables come from a variety of reduced form equations which have substantial empirical plausibility. What I found most interesting about the paper was the incredible lags, often on the order of 25 years, between a change in education policy and its impact on economic growth. Moreover, similar lags are observed in the impacts on social outcomes such as poverty and inequality. This is an incredibly ambitious modelling exercise.

The results are of course sensitive to the estimated dynamics given the lags involved, and, given the rather short data span relative to these lags, the estimates are likely to be fragile. However, the message, if not the exact numbers, of this paper should be clear. Economic and social policy interact in highly significant ways. From the policy point of view, however, the incredibly long lags are a problem for both politicians and for social scientists. For the politicians with time horizons defined in terms of a typical electoral cycle, any positive policy change will not bear fruit (positive or negative) within their political life. For social scientists who typically use cross-sectional data or highly aggregate time series data covering a couple of decades, we have a daunting task in attempting to unravel the causal pathways running from economic to social policy and vice versa.

Both the McMahon and Coulombe papers focus in part on economic growth and human capital. The Coulombe paper is an investigation using Canadian provincial data of the convergence effect on income and human capital as it interacts with both urbanization and some province-specific effects. Interestingly, he finds that there is much stronger convergence over the post-war period in human capital than in income. Urbanization has a strong positive effect on both the speed of convergence and steady-state values of income and human capital. For two provinces, Quebec and Alberta, he finds there are some specific factors which led to some significant differences from the other provinces. Regional inequality is an old and well-researched topic in Canada. The use of the growth convergence methodology is a welcome addition to the existing approaches. A regional economist would ask the obvious following questions. First, the fact that strong convergence is found in the human capital variable must reflect the role of the federal government in promoting a common vision, and in providing support, for national education standards. Secondly, the relatively weaker speed of convergence in incomes may reflect the centre-periphery nature of economic development in Canada, with small resource-dependent provinces having lower growth rates in income than other larger provinces which have a much greater share of activity in non-resource manufacturing and services. There are some theories which suggest that divergence in regional incomes rather than convergence is the likely outcome of market forces left on their own. The convergence-growth framework does not distinguish between a lack of growth in initially poor regions, relative to other unspecified structural reasons as to why certain peripheral regions tend to diverge in income levels from the centre region. Moreover, by forcing a common convergence structure across all provinces (regions), the framework tends to miss what many regard as an essential and persistent asymmetry in many countries' regional growth pattern.

Two of the papers emphasize the role of community and neighbourhood effects. There is now a rich literature developing on the role of neighbourhood effects on a variety of social outcomes, and while not directly related to social capital, it is clearly complementary to the social capital approach. The paper by Barbara Wolfe and Robert Haveman is another application of their justifiably well-known approach to the identification of the non-market effects of education. As in the case of the papers already discussed, there is an emphasis on the interaction between human capital (education) and other social outcomes, in particular on the schooling of children and fertility choices. They summarize a large number of studies showing that education has a positive effect on these social outcome variables. Second, they find that neighbourhood effects sometimes appear to have important impacts on youth human capital. They note, however, that many of these effects are sometimes insignificant in the studies surveyed. The paper then goes on to use their established methodology to estimate the total benefits to individuals from additional education, taking into account that education has an impact on these other outcomes. It is important to emphasize that the methodology used assumes the non-market benefits to education are privately appropriable. On efficiency grounds, therefore, the fact that the total benefits to education are much greater than the increased earnings that education brings does not, in and of itself, provide a market failure argument for support of public education. It does, however, caution us that looked at from the point of a merit good, or as an in-kind program for the promotion of equality, public education may have a much greater impact than the traditional wage-schooling regressions would suggest.

The paper by Willms on the measurement and impact of socio-economic status on literacy outcomes is well beyond my area of expertise. His results seem extremely interesting and broadly consistent with my own prejudices. As in the case of Haveman and Wolfe, he suggests that community effects (or more specifically school effects) can be quite important. On balance, both these papers suggest that the "neighbourhood" view of social capital is a useful complementary approach to that of Putnam.

The paper by Stephen Knack is closest to the traditional "social capital" literature, and one that economists no doubt will feel most comfortable with in drawing conclusions about the empirical usefulness of the social capital concept. In his introduction, Knack emphasizes the "radius of trust" and cooperation definition of social capital. A lot of economic activity is coordinated through both these mechanisms and there are thus good reasons to expect economic growth to be related to good measures of these. How good? Knack notes this has been a standard criticism of the cross-sectional growth literature on social capital. He argues that the World Values Survey variable is a useful proxy for "true" measures of trust and cooperation across societies. Using a Barro-type growth regression, he finds that in a sample of 29 market economies trust positively affects growth, and suggests that the link is in part through its impact on investment. The paper then goes on to look at a measure of the density of association reported in the World Values Survey and argues this is related to Putnam's original notion of the density of horizontal networks. He finds that neither growth nor investment are related to this variable. Furthermore, this holds up when one tries to eliminate group memberships based on rent-seeking motives – "Olson groups." He also finds paradoxically that Putnam groups have a significant negative effect on growth. This is clearly contradictory to the basic theoretical models linking social capital to growth and merits further investigation.

There was a lot to think about in these papers. They have not convinced me that social capital is a concept that will become standard in the growth economist's toolkit. I do think, however, that as a complement to human capital, and neighbourhood effects, it certainly provides a challenge to economists to broaden their horizons both theoretically and empirically.

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Part 4

Social Arrangements, Well-Being of Citizens and Economic Growth

13

Social Cohesion, Public Policy and Economic Growth – Implications for OECD Countries

Jo Ritzen[1]

Introduction

One of the paradoxes of our age is that the more things come together, the more they fall apart. As the Internet, global telecommunications and air travel convey ideas and resources at ever-faster speeds to ever-greater numbers of people at ever-lower cost, so there appears to be almost a Newtonian "equal-and-opposite reaction" manifesting itself in a retreat into ethnic or religious identities and geo-political separatism. Part of this process has been the somewhat more benign, but no less challenging, process of localization; that is, a reaction among citizens and workers alike against real or perceived threats of globalization (World Bank 1999). As Benjamin Barber (1995) notes, it is perhaps not a coincidence that today's world news is dominated by mergers of major multi-national companies, secessionist battles, and the proliferation of new states based on ethnic identities in the aftermath of social or ethnic conflict. AOL-Time Warner and East Timor may have more in common than we might imagine.

This paradox of our age mirrors those of earlier times, such as the enlightenment, the industrial revolution, and most recently, the Cold War. The common thread running through these historical moments of widespread social change is a deep concern about how and whether society as we have known it will remain possible. It places an extraordinary burden on leaders – political, academic, and business – to confront these complex and destabilizing issues. It also compels us to listen to our communities and societies, to heed their fears, concerns and aspirations.

Political philosophers and sociologists refer to the underlying issue here as the problem of order (Wrong 1994). How do individuals create and sustain social order? How should we respond when that order appears to be breaking down? In contemporary discussions, especially in the OECD countries, a host of social maladies, such as rising teenage parenthood, economic inequality, unemployment, the displacement of people[2] and falling civic participation, have been identified as symptomatic of the breakdown of social order. Are these social problems related to economic performance? If so, how? How can we mobilize our human and social resources in the pursuit of a more inclusive economy and society? More generally, how does the problem of order relate to the problem of economic growth?

The short answer to these questions is that we do not really know for sure. The long answer is that a fascinating body of literature from across the social sciences is gradually coalescing into a more or less coherent framework that will greatly enhance our capacity to provide a more rigorous answer. The body of knowledge on which this framework is based has been pioneered by academic scholars such as Dani Rodrik, Peter Evans, Robert Putnam and Amartya Sen, and my colleagues in the Development Research Group at the World Bank, especially Paul Collier, David Dollar and William Easterly. An overview of their work is represented in the *World Development Report 2000*, on poverty, and will feature more prominently in the *World Development Report 2001*, on institutions. Importantly, we are also learning from the voices of poor and marginalized people themselves. A key feature of this year's World Development Report on poverty is that it incorporates the findings of a major study undertaken in 63 countries on how the poor understand the causes, experience and consequences of poverty.[3] We have learned that listening attentively to the poor, and forming genuine partnerships with them, can make a big difference in terms of how we respond, and how we evaluate our actions.

This is the first of three papers in which I will endeavour to apply this emerging framework to economic development issues around the globe. This paper concerns itself with the OECD countries, the second will address transitional countries, and the third the developing countries. I begin by providing a brief overview of the World Bank's objectives, and recent innovative strategies that have been developed to meet them. Thereafter, I introduce the idea of social cohesion and the various ways in which it has been used (and abused) over the years. I also compare the similarities and differences between its conceptualization in the developed and developing world. I then argue for the importance of adding an institutional context to social cohesion, and incorporate the notion of "room-for-maneuver." I provide a summary of the broad evidence in support of the thesis that socially cohesive societies governed by responsive public institutions are more likely to pursue pro-poor economic growth strategies. In conclusion, I explore the implications of this evidence for development policy. An important and recurring theme of this paper is that social cohesion should not be seen as primarily a developing country concern; indeed, I dislike the very distinction between "developed" and "developing" countries. Social cohesion, like the problem of order it seeks to flesh out, is as important in Sweden as it is in Swaziland, in Canada as it is in Colombia, in the Netherlands as it is in Nigeria.

The World Bank's Objectives and Strategies

The World Bank's primary goal is to uproot poverty and effect long-term, equitable and sustainable development in so-called underdeveloped and transition countries. The touchstone of our work is the Comprehensive Development Framework (CDF) and our Poverty Reduction Strategy Papers (PRSP). The essence of the CDF is the understanding that development entails more than just "getting the macro-economic fundamentals right." To be sure, low inflation, balanced budgets, macro-economic stability, etc. are important, but they are not ends in themselves; rather, they are a means to an end, and that end must be to reduce poverty. The CDF gives countries primary responsibility for devising, implementing and monitoring development projects; it places individual countries in the driver's seat.

Another important feature of our approach to reducing poverty is a recognition that doing so requires far more than just transferring financial or physical resources. Equitable and sustainable development also requires the transfer of knowledge, ranging from ideas about how to design good schools to disseminating data on the effectiveness of particular social protection strategies. Building up the technical skills and administrative capacities of client countries is vital if they are to assume their place in the driver's seat with confidence. To this end, we are endeavouring to re-invent ourselves as the Knowledge Bank, an institution as concerned with sharing ideas and building local capacity as it is lending money. A Knowledge Bank is central to building social cohesion in countries around the world, because it enables us to make our intellectual resources available to the most people at the least cost, to share best practices and to foster greater transparency. The CDF and (especially) the PRSP both give high priority to social aspects, but it is important to be clear about why and how these social aspects in general, and social cohesion in particular, might influence efforts to reduce poverty in **all** countries, not just low-income countries.

These changes in the World Bank's approach to poverty reduction are the result of a number of factors. On the one hand, historical events and technological change have created new opportunities for innovation. In a post-Cold War world struggling to transform former planned economies into open market economies, it is both necessary and possible to give greater attention to social and institutional issues. The Internet enables World Bank staff to provide rapid support to our clients, and to disseminate documents and data at the click of an icon, thereby enabling even critics of the Bank to have full access to our products. The draft issue of the *World Development Report 2000/01*, for example, was available online to enable all interested parties to contribute to the final product. On the other hand, we also now have greater intellectual freedom, more comprehensive data and powerful new ideas emerging from both the scholarly community and from practitioners. These ideas – and the evidence on which they rest – enable all of us to move beyond the constraints of well-worn paradigms, retrieving what is useful from them but moving forward with a greater sense of openness to the insights of different disciplines, methodologies and vocations.

For the purposes of this paper and this symposium, however, I want to focus on a conceptual framework of development in the OECD countries, one that is both informed by and that shapes the World Bank's approach to policy and projects. As the title of this paper suggests, I have adopted the term "social cohesion" and placed it at the centre of this framework, as I believe it most neatly captures the two elements of a country essential for equitable economic growth, namely an inclusive civil society and responsive political institutions. I am aware that many different "social" labels – social capital, capability, exclusion, infrastructure – have recently been coined to capture these concerns, but my own preference is for the concept of social cohesion, since it captures most succinctly these twin features of inclusion and responsiveness at the societal level.

Does the term "social cohesion" help us in understanding development in a particular country? Does it help to order our thoughts? And if so, can that reflection be tested empirically? These are important questions for researchers. They also set the stage for politicians: is the term "social cohesion" useful for the politician in making decisions? A second set of questions immediately follows from positive answers on the first set. If social cohesion makes sense analytically (and maybe also empirically), then we would want to know how social cohesion itself develops, how it grows or declines, and how political decisions can influence social cohesion. It is not so much social cohesion in itself that has captured my interest, then, but rather its potential for helping us understand a range of development outcomes.

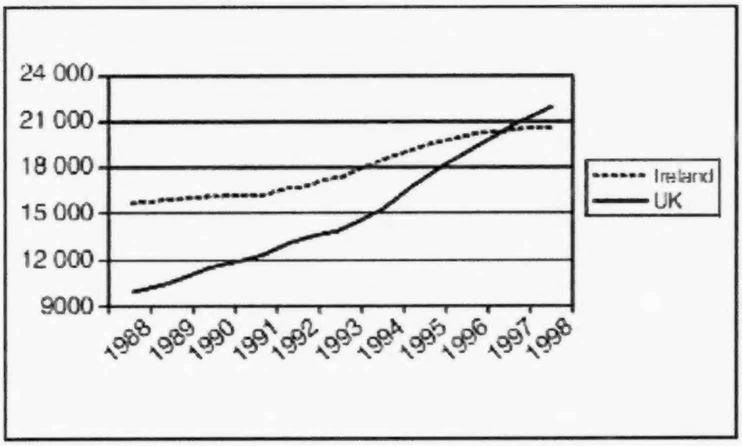
Understanding Social Cohesion

This OECD symposium is titled "The Contribution of Human and Social Capital to Sustained Economic Growth and Well-Being." Most of the contributions to this symposium use the term "social capital" to denote what in this paper I describe as "social cohesion," a term I prefer for a number of reasons. I find the term "capital" to be confusing because many of the characteristics of physical capital do not apply (e.g. divisibility, non-negativity, the possibility for establishment of ownership and for market transactions). As a former politician myself, I want to use terms that policy makers and citizens alike intuitively understand and are comfortable with. I also want to refer to broader features of society, whereas social capital is primarily concerned with networks and communities. It is true that the term "human capital" does not satisfy the characteristics of physical capital either, but at least one of the common elements about human and physical capital – as Glaeser, Laibson and Sacerdote (2000) and others rightly point out – is that **individuals** decide on the investments. With social capital it always takes two to tango; indeed, given the number of people often involved in a network, social capital may be more of a square dance than a tango! In the end, however, the use of a particular term over another matters far less than that the issues they all encapsulate are brought to the table and seriously debated.

My reflection takes as its point of departure missing clues in the mystery of development. Consider the case of Ireland, for example, which emerged from a relatively poor OECD country to recently overtake the UK in gross domestic product (GDP) per capita (see Figure 1). The explanations for this rise are quite solid: the Irish combined sound fiscal policy and a strong human development policy, with a commitment to the rule of law and peaceful labour relations in an open country environment (Barry 1999). But we would like to look behind these explanations, since they tell us nothing about **how** the Irish were able to organize these good policies. Conversely, consider Argentina, which fell from being one of the richest countries in GDP per capita in 1920 to developing country status now, doing so largely because of its poor choice of economic policies. In general, we know that good policies matter for development; what is needed is more and better insights into why good policies come about in one country but not in another.

Figure 1

GDP/c (PPP) in Ireland and the UK



Social cohesion may provide one of those clues. The expectation that it might be **the** clue does injustice to the complexity of development. Moreover, social cohesion may be no more than an analytical concept: helping us to organize our thinking on the complex processes which lead to social or political choices which may better serve short- or long-term development. But social scientists and politicians alike who are from a Popperian descent would like to see whether measures can be developed to test empirically the social cohesion hypothesis. Accordingly, we need to be as precise as we can in terms of providing a definition of social cohesion, and as rigorous as we can in terms of assembling the available evidence.

Social cohesion has many formal definitions (see Appendix 1). Judith Maxwell (1996, p. 13), for example, argues that social cohesion refers to the processes of

> building shared values and communities of interpretation, reducing disparities in wealth and income, and generally enabling people to have a sense that they are engaged in a common enterprise, facing shared challenges, and that they are members of the same community.[4]

This otherwise excellent definition, like much of the work and thinking on social cohesion, is essentially focussed at the community level, but in my deliberations on these matters I have found it necessary to incorporate a macro-political component. This is so because the quality of government – at the local, state and national level – has a major bearing on the capacity of societies to negotiate solutions to their problems, and to advance collective interests. Whether those problems or opportunities stem from domestic or international sources, the broader legal and institutional environments in which they occur shape and constrain the range of possible actions, and the extent to which any of them can be successfully implemented. My shorthand for these latter factors is "room-for-maneuver." (A summary of my conceptual framework is outlined in Appendix 2.) It is my contention that a country's social cohesion (i.e. the inclusiveness of its communities **and** its institutional room-for-maneuver) has a vitally important role in managing the effectiveness of that country's policy response to the vagaries of the global economy. If social scientists can demonstrate this empirically, then politicians and policy makers should be able to see its significance for their country, and act accordingly.

To this end, I define social cohesion in the following way:

> Social cohesion is a state of affairs in which a group of people (delineated by a geographical region, like a country) demonstrates

an aptitude for collaboration that produces a climate for change that, in the longer run, benefits all.

Presumably, what has been given to the authors of the different contributions for this symposium as a definition of social capital (i.e. the norms, networks and other related forms of social connection) will be an important basis for this aptitude. At the same time, it will matter how, with whom, and on what terms these norms, networks and other connections are made. Linking relations that connect people from different socio-economic groups are presumably the most important of these, compared to bonding (family, friends) or bridging (colleagues, horizontal ties) relations (Woolcock 2000, World Bank 2000).

In seeking to unpack this notion of social cohesion, let me stress from the outset that I am fully aware of the fact that some political partisans with a narrow – even sectarian – agenda have had an unfortunate history of invoking "social cohesion"-type arguments as the basis for their actions. The desire to cultivate a sense of national unity and "purity" brought us the holocaust and ethnic cleansing, so I am most surely not arguing that social cohesion equals cultural homogeneity or intolerance of diversity; quite the opposite. Nor am I invoking some naive suggestion that if we all held hands and sung "We are the World" enough times our differences and problems would disappear! Rather, I use the concept of social cohesion to make the point that – whether the entity concerned is a community, a corporation or a country – the extent to which those affected will work together when crisis strikes or opportunity knocks is a key factor shaping performance. Graphic scenes on CNN during the 1997 financial crisis in South Korea provided a fascinating case of social cohesion in action, of people tearfully parting with family treasures in the belief that their humble contribution was making a difference. Where this cohesion is lacking – as it was in Indonesia – the response to crisis is far more sluggish, heightening a number of other political tensions. Dani Rodrik (1997, p. 7) accurately notes that crises of this sort are "not a spectator sport – those on the sidelines also get splashed with mud from the field. Ultimately the deepening of social fissures can harm all."

Social cohesion may differ in conception in various countries and regions, but it is equally important for every society. Conceptions of social cohesion differ among the OECD countries, and between OECD and less developed countries, in terms of the themes and approaches given priority. In OECD countries, discussions about social cohesion are driven by a concern to maintain an inclusive society able to withstand external shocks and the harsh effects of a global economy. In the developing world, social cohesion is discussed more in terms of reconstructing and developing a sense of shared identity. Encouraging effective rule-of-law (especially in post-conflict societies), and developing a new set of formal institutions for managing exchange that complements existing informal institutions, is a high priority. Social cohesion in transitional countries is driven by three general concerns. First, to maintain a measure of equality and inclusiveness as free(er) markets reward the skills of some more than others. Second, to forge a sense of trust, confidence and cooperation where previously there was suspicion, paranoia and deceit (Secret Police, etc.). Third, to construct transparent, accountable and flexible public institutions for managing new forms of risk and reward.

A common set of questions unites this literature. However, perhaps the most fundamental are: How do countries keep their societies cohesive (intact) during times of significant change and transformation in the face of the harshness of global economic processes? A sub-set of questions includes much more complex (and theoretical) questions, such as: Why do individuals form social groups? What are the bases for inclusion and exclusion? How are conflicting interests negotiated and, if required, how are they managed?

We are hardly the first to ponder these questions. Emile Durkheim, one of the founders of modern sociology, believed that if all members of a society were anchored in a common set of symbolic representations – to common assumptions about the world they live in – moral unity could be restored. Without these moorings, he argued, any society, primitive or modern, was bound to degenerate and decay, to be left unprotected against existential crises. One can ask of policy makers, political leaders and others who "celebrate diversity," whether there needs to be "a common set of symbolic representations" or "common assumptions" (a set of values and objectives that a society or community coalesces around) in order to bring about the desired change. If indeed there is a set of common values, or assumptions, what ought they be? Whose ought they be? These questions become critical for development and for uprooting poverty during times of great social change (of the type commonly associated with developing countries) and when broader, systemic transformation undermines or challenges existing (familiar or traditional) systems of economic, social and political organization. These are among the questions that arise from the literature on social cohesion and are implicit, too, in the World Bank's policy debate on development.

To understand social cohesion, one ought perhaps to take a step back and look at social exclusion and its four main causes. In its economic dimension, exclusion is first and foremost linked to poverty. Although in some instances it may be the cause, in general it is understood to be largely the result of poverty. The unemployed are typically excluded from mainstream economic activity and are, therefore, denied access to property and credit. In most of the developing world, especially Africa, long-term unemployment has rendered many people unemployable.

The second dimension is social: unemployment does more than deprive one of an income, in most societies unemployment greatly reduces one's status in society. Exclusion takes on a political (third) character when certain categories of the population (women, ethnic, racial and religious groups, especially minorities) are deprived of access to their rights. A fourth dimension is identified as "non-sustainable modes of development." This is explained as development that compromises the survival of future generations, and which excludes them from the benefits of feasible, durable development.

There is a very short leap, conceptually, between social exclusion and social cohesion; indeed, they can be understood as two sides of a coin. However, addressing exclusion and developing more cohesive societies is a task complicated by lack of coherence in the understanding of what makes a country or a community cohesive, and when the prevailing orthodoxy equates society with economy. The notion of exclusion raises the point that there are often pockets of disaffected and/or marginalized groups within society – which can cause rupture and stand in the way of development or integration. For instance, whereas cohesive communities are able to identify problems, prepare objectives, develop strategies to meet those objectives and put them into action, distinct pockets of cohesion may fracture and divide the community or broader society and undermine the trust that is essential to collective action. Listening to the concerns of isolated groups, and incorporating them into the broader vision of society, is an important task for politicians.

In the context of globalization, social cohesion enables us to recognize the continuous process whereby individuals and groups are included or excluded from participation within wider society. It can also refer to the measure of shared values, or to a willingness, refusal or indifference to face common challenges in a society. These are influenced, in turn, by any combination of a variety of factors such as, for example, ethnicity, culture, religion, gender, education, class, physical disability and associations of choice.

Heyneman (2000) identifies two useful starting points for helping us arrange these multiple factors. He stresses that human cooperation turns on the presence of **clear institutional rules**, which guide all types of organizations, and the **stabilizing traditions** within these organizations. Following North, Heyneman defines **institutional rules** as codes of public conduct, norms of behaviour, manifest statutes, common law and contracts among individuals and organizations. Stabilizing traditions within each organization differ from one another. He reduces organizations to four main categories (political, economic, social and educational), each making its own contribution to social cohesion.

Heyneman draws a special link between social cohesion and education. This is interesting, because the social capital literature has traditionally stressed the role of communities and parents in school performance; the social cohesion literature, Heyneman implies, argues that the causal arrow may also run in the opposite direction. He identifies three ways in which education contributes to social cohesion. First, it helps provide public knowledge about social contracts among individuals and between individuals and the state. Second, schools help provide the context within which students learn the appropriate behaviour for upholding social contracts, by providing students with a range of experiences in which they learn how to negotiate with people, problems and opportunities they might not otherwise encounter. As Heyneman (2000, p. 177) puts it, "the principal rationale, and the reasons nations invest in public education, have traditionally been the social purpose of schooling... The principal task of public schooling, properly organized and delivered, has traditionally been to create harmony within a nation of divergent peoples." Third, education helps provide an understanding of the expected consequences of breaking social contracts; indeed, it helps citizens understand and appreciate the very idea of a social contract. An important implication of Heyneman's arguments is that measuring human capital simply in terms of "years of schooling" may be missing a vitally important component, namely that the quality of education matters as much as – if not more than – quantity.

If social cohesion matters for the well-being of all societies, it becomes necessary to ask, who, or what, vehicle is most suited to creating or engendering it? The literature places the burden before governments and most arguments converge on education as the key. Given the vital role the state has in shaping the context and climate within which civil society is organized, it can, in some cases, also actively help to create social capital – this is one of the conclusions of the forthcoming World Development Report (World Bank 2000). Can or should the state play a similar role in the creation of social cohesion? If so, what should the role of the state be? Here we have to move to the policy environment, where international, regional and national efforts have been under way for most of the past 10 years to try to identify the problems caused by social exclusion and the range of responses required for greater social cohesion. Learning the lessons from these efforts, and incorporating more reliable and valid measures of social cohesion into our research programs, is an important next step.

Measuring Social Cohesion

Social cohesion as an aptitude has to be proven by showing that it is working, that it does render social change of the type which benefits long-run development. One encounters in the literature a great number of different measures, both direct and indirect. Among the direct measures are:

- measures on membership rates of organizations and participation in organizations
- measures on social relations and trust
- performance measures of public and private institutions

Indirect measures are related to structural factors such as class, ethnicity and gender inequalities, which may undermine the capacity of different groups to work together, such as:

- income distribution measures (Gini coefficients, and share of income to middle 60%)
- ethnic heterogeneity ("ethno-linguistic fractionalization")
- measures of gender discrimination in education, income and health

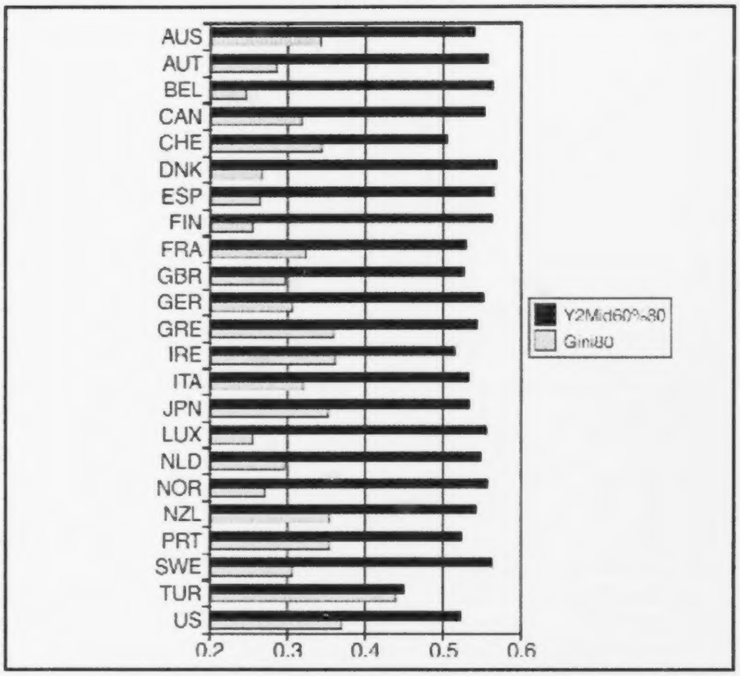
Robert Putnam's important work uses membership of organizations as a measure of social cohesion. There are sharp differences, however, between his assessment of the US and that of many European countries, where indeed social cohesion went up as measured in this way. Is this variance in "social cohesion" – as measured by a richness of participatory processes in organizations – related to strong variance in social and economic policy reform? I do not think so. Hence, I question whether Putnam's measure is that relevant for social cohesion as I have defined it. The results presented by Steve Knack at this symposium seem to support this.

Social relations have been measured in developing countries by Deepa Narayan and her collaborators (e.g. Narayan and Pritchett 1999), but mostly on a micro (community) scale. At that level, they are shown to be significant predictors of an aptitude for cooperation and trust. The same holds true for measures of political trust (Knack and Keefer 1997). New surveys being conducted around the world, by such OECD countries as Australia and members of the European Union, promise to yield significant new insights, and will allow us to address these issues with much greater confidence.

In the meantime, one can use a variety of other societal measures to proxy for social cohesion (or its absence). Measures of income distribution, for example, such as the Gini coefficient, have been used by Dani Rodrik (1999) to address issues pertaining to economic divisions in society. William Easterly (2000) finds that what he calls the "middle class consensus" (i.e. a social inequality index that includes the share of income going to the middle 60% of the population) is a better measure. The latter measure definitely gives a better explanation for the OECD countries. Within these countries, the US has the second largest Gini coefficient (0.39 in 1997); Turkey has the highest (0.41), while Finland has the lowest (0.24). Yet, it would be very difficult to show that these differences in Ginis are predictors of enormous differences in aptitude for change (and consequently in change). The measure of middle-class consensus is more equal across OECD countries than the Gini coefficient (see Figure 2). This is why we need to consider politics.

Figure 2

Comparison of economic inequality measures in selected OECD countries



Consider, for example, the recent interest in corruption (e.g. La Porta et al. 1997). A central hypothesis emerging from my social cohesion framework is that corruption will greatly undermine a government's "room-for-maneuver," in the sense that it will distort the signals and incentives being received by policy makers, and also erode confidence in public institutions. Arguments that corruption "greases the wheels" of growth simply do not stand up to empirical scrutiny (Tanzi and Davoodi 1997).

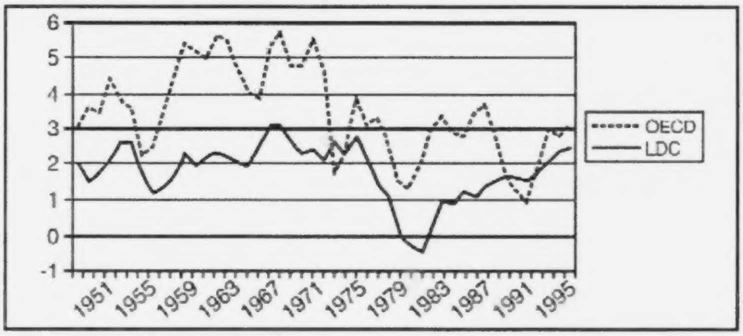
Social Cohesion and Economic Performance in the OECD Countries

In the passages that follow, I wish to briefly review the evidence in support of this general framework. The most careful work to date has been conducted on developing countries, and I will present some of it here. If the arguments hold true across a broader range of cases, however, we should also expect them to be true of OECD countries.

The central story of economic growth over the last 50 years has been the contrast between the years 1950 to 1974 and 1975 to 2000. The former was a time of general prosperity, in which all strategies yielded positive outcomes; rich and poor countries, open and closed economies, temperate and tropical countries – everyone did well. The 20-year period between 1974 and 1994, however, was disastrous for virtually everyone except the East Asian Tigers; the developing world, in particular, suffered an enormous growth collapse, from which it has only recently emerged. Figure 3 presents the annual median growth rates over this period, and contrasts the performance of OECD and less developed countries (LDC).

Figure 3

Smoothed median growth rates, 1951–1997



While the causes of the global recession in the 1974 to 1994 period are fairly well known, it is instructive to examine some of the differences between those countries that weathered the storm, and those that did not. Rodrik (1999) finds compelling evidence for a large sample of developing countries that weak public institutions and divided societies performed significantly worse than did those with high quality institutions and united societies. Although the sample of OECD countries is smaller, it is my hypothesis that a similar story – though perhaps with a different twist – can be told. Clearly, the OECD countries have a vast stock of sophisticated insurance mechanisms and safety nets (unemployment benefits, old-age and disability pensions, etc.) that help to keep citizens more or less in the same boat. But what about non-citizens? My suspicion is that our formal statistics fail to capture the large number of people – the poor, illegal immigrants – who fall through the cracks. Even given these factors, it is interesting to note that corruption remains an important issue for OECD countries. As Figure 4 shows, OECD countries with (relatively) high levels of corruption lag behind their counterparts with more transparent and open institutions.[5] For countries that depend enormously on formal institutions to manage vast and complex economic activities, continuing to support and improve public and private institutions is vital for reaching the poor. Indeed, less corrupt institutions are empirically linked with pro-poor growth (Figure 5).

Figure 4

Corruption levels in OECD countries

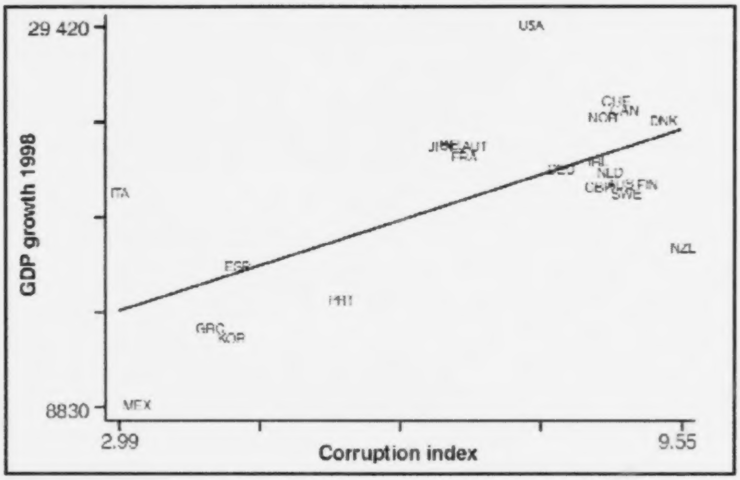
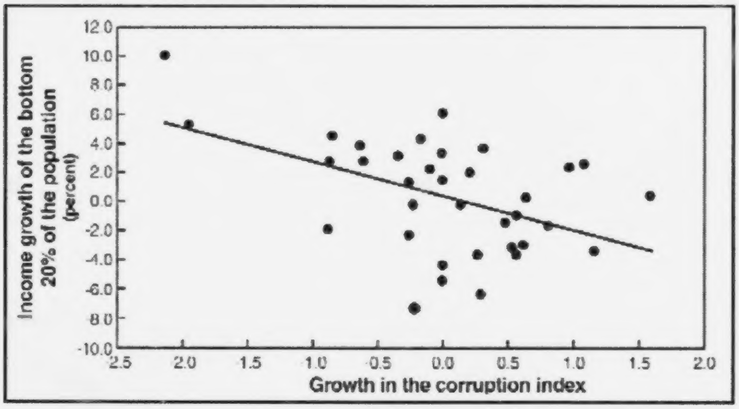


Figure 5

Growth in corruption index



Conclusion

Let me conclude by pulling together some of the strands of this paper. On the preceding pages I have drawn attention to several points. The first of these is the need for a deeper consideration of, and a more focussed research agenda into, the cohesiveness of societies and the quality of public institutions, and their relationship to sustained growth. We need to know a lot more about how to manage equitably the costs and benefits associated with the transformation of society, especially how to foster a greater sense of cooperation and inclusion in environments where there is division and hatred. This is an issue for all countries, not just those in the developing world. Building social cohesion matters as much in Ireland as it does in Somalia.

While these problems are enormously challenging, I think we can be greatly encouraged by the recognition that our definitions and conceptions of development have evolved quite dramatically in recent years. The accomplishments and recent traumas in East and South East Asia, the difficulties of building market institutions in former planned economies, and major conferences such as the UN Summit on Social Development, have shown us just how important it is to invest in the human and social dimensions of development. Healthy, educated people are not only more productive workers, they are also better parents, better neighbours and better citizens. It is my hope that recent events have also taught us the importance of being more humble – though no less committed – in our approach to poverty reduction, of listening more and talking less.

Taking stock of the historical record also reveals that even when it is done well, development is inherently fraught with controversy, that rising prosperity necessarily alters the balance of power in society. As the social historian Theda Skocpol (1979) notes, revolutions are more likely to occur when conditions are **improving**, not deteriorating. This means that we must pay special attention to designing policies and projects that protect the most vulnerable members of society. My colleague Joe Stiglitz (1998) observes that development "represents a *transformation* of society, a movement from traditional relations, traditional ways of thinking, traditional ways of dealing with health and education, traditional methods of production, to more 'modern' ways" (p. 3; emphasis in original). Adopting and adapting these "more modern ways" is no easy task. Among other things, it requires credible local leaders who are able to articulate the interests and aspirations of the people, to identify a set of objectives and ideals around which those can coalesce. It requires a genuine sense of ownership and responsibility on the part of all stakeholders, and a commitment to work together.

Let me finish by returning to the paradox with which this paper began. The paradox was that the increasing scale and scope of our global economic affairs is simultaneously reawakening our sensitivities toward local issues and identities. An important feature of this paradox is that its resolution depends on overcoming two corresponding trends militating against it, namely increasing inequality (Pritchett 1997) and increasing volatility. The technology that makes life more stimulating, cosmopolitan and prosperous for some is making it more precarious and uncertain for many others. Managing the risks and rewards of globalization is thus the key policy challenge of our time. Doing so effectively and responsibly will entail giving renewed attention to social safety nets protecting the most vulnerable members of society. It will entail building more responsive and accountable public institutions that can anticipate problems, and make swift adjustments. It will entail encouraging leadership across all levels of society – from soccer coaches and classroom teachers to business executives and heads of state – to build bridges across the widening social and economic divides.

An inclusive economy and society requires a serious commitment to building and maintaining social cohesion. It matters in all countries and for all members of society, especially the poor, and their prospects of living with a sense of empowerment, security and opportunity. I hope you will join us at the World Bank in helping to make that dream a reality.

Notes

[1] This paper greatly benefited from input from Michael Woolcock and Ismail Lagardien.

[2] Social exclusion, dislocation and the displacement of people and whole communities is not a sub-national, or a "third world" issue; indeed, Europe's share of the international refugee crisis is almost as dire as that of Asia and Africa. Where protracted social and political conflict in most of the developing world and in central Europe has resulted in an estimated 21.5 million people being rendered "**population of concern**" for the United Nations High Commission for Refugees, Africa, Asia and Europe are about evenly matched with refugees, asylum seekers, etc. (see United Nations High Commissioner for Refugees 1998).

[3] *Can Anyone Hear Us?, Crying Out for Change and From Many Lands* (Three Volumes in the "Voices of the Poor" Series). See Narayan (2000), Narayan et al. (2000), and Narayan and Petesch (2001).

[4] As cited in a comprehensive review of the literature by Jensen (1998).

[5] Note that the corruption index measures the degree of transparency and accountability in public institutions, hence higher levels of corruption are associated with lower scores.

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Appendix 1:
Various Definitions of Social Cohesion

Canada
Social cohesion is an ongoing process of developing a community of shared values, shared challenges and equal opportunities within Canada, based on a sense of trust, hope and reciprocity among all Canadians.

France
Social cohesion is a set of social processes that help instill in individuals the sense of belonging to the same community and the feeling that they are recognized as members of that community.

New Zealand
Social cohesion describes where different groups and institutions knit together effectively despite differences. It reflects a high degree of willingness to work together, taking into account diverse needs and priorities. Social cohesion is underprinned by the four following conditions:

1. Individual opportunities – including education, jobs and health
2. Family well-being – including parental responsibility
3. Strong communities – including safe and reliant communities
4. National identity – including history, heritage, culture, and rights and entitlements of citizenship

Australia
Social cohesion is the bond between communities of people who co-exist, interact and support each other through material means and by sharing group beliefs, customs and expectations.

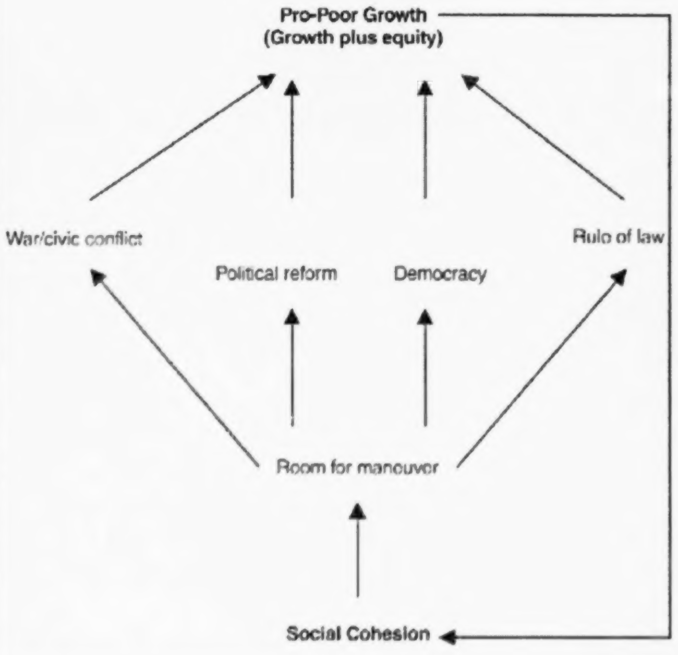
Denmark
Social cohesion refers to a situation where everyone has access to establishing basic social relationships in society, such as work participation, family life, political participation and activities in civil society.

European Union
Article 2 of the Treaty of the European Union states that the tasks of the union included: "Maintaining economic and social cohesion and solidarity between all member states of the Union."

The objective of social cohesion implies a reconciliation of a system of organization based on market forces, freedom of opportunity and enterprise, with a commitment to the values of solidarity and mutual support which ensures open access to benefit and to provide protection for all members of society.

Source: Government of Canada, 1999

Appendix 2: A Conceptual Framework


Pro-Poor Growth
(Growth plus equity)
War/civic conflict
Political reform
Democracy
Rule of law
Room for manouver
Social Cohesion

14

Comparisons of Trends in Gross Domestic Product and Economic Well-Being – The Impact of Social Capital[1]

Lars Osberg and Andrew Sharpe

1. Introduction

In 1980, Ronald Reagan asked the American people a seemingly simple question: "Are you better off today than you were four years ago?" Although US per capita disposable real income was, in 1980, some 7.6 percent higher than in 1976, his audiences answered "No!" More recently, when Canadians were asked in 1998 how the overall financial situation of their generation compared to that of their parents at the same stage of life, less than half (44%) thought that there had been an improvement – despite an increase of approximately 60 percent in real Gross Domestic Product (GDP) per capita over the previous 25 years.[2] Evidently, national income accounting measures may not necessarily be a good guide to popular perceptions of trends in economic well-being.

Are such popular perceptions unreasonable? National income accounts omit consideration of many issues (e.g. leisure time, the length of life) which are clearly important to the well-being of individuals. For many years, the System of National Accounts (SNA) has been the accounting framework within which most discussions of trends in economic well-being have been conducted, and GDP per capita has been an often used summary measure of economic trends.[3] The compilers of the national accounts have often protested that their attempt to measure the aggregate value of marketed economic output was never intended as a full measure of economic well-being – **but** it has often been used as such. In particular, analyses of the connections between social capital and GDP usually ignore the sometimes tenuous nature of the link between GDP and economic well-being. However, there is good reason to believe that the issues omitted from consideration in GDP accounting are especially relevant to social capital.

Summarizing the economic well-being of a complex society inevitably requires a series of ethical and statistical judgements. There are many different dimensions to well-being, which are valued to different degrees by different observers. With a single index number, it may be difficult to disentangle the relative importance of value judgements and technical measurement choices in the construction of the index. Osberg (1985a), therefore, proposed that an index of economic well-being should be based on indices of consumption, accumulation, inequality and insecurity, **with the explicit recognition that the weights attached to each component will vary, depending on the values of different observers**.[4] The underlying hypothesis is that public debate is likely to be improved if issues of fact, analysis and values are as clearly separated as possible.

This basic framework – that a society's well-being depends on societal consumption and accumulation, and on the individual inequality and insecurity that surround the distribution of macro-economic aggregates – is consistent with a variety of theoretical perspectives. We, therefore, avoid a specific, formal model.[5]

As part of a larger project on the state of living standards and the quality of life in Canada, the Centre for the Study of Living Standards (CSLS) has constructed the index of economic well-being proposed by Osberg (1985a) for Canada (Osberg and Sharpe 1998), Canadian provinces, and for the US (Osberg and Sharpe 1999). This paper extends the index to the US, UK, Canada, Australia, Norway and Sweden, with a base year of 1981, and includes specific consideration of differentials in working time.

The paper is divided into three main parts. Section 2 develops estimates of the four key components or dimensions of the index – consumption flows, stocks of wealth, inequality and insecurity. Section 3 develops preliminary estimates of the overall index and its components for the US, UK, Canada, Australia, Norway and Sweden, six countries that clearly exhibit very different trends in some of the aspects of economic well-being which are omitted from GDP accounting.[6] Section 4 compares trends in the index and its components, and Section 5 discusses the linkage between social capital and trends in economic well-being.[7]

2. An Index of Economic Well-Being

GDP is a measure of the aggregate marketed income of a society, and most of its proposed substitutes (e.g. the Genuine Progress Indicator) are also primarily measures of adjusted average annual "income" flows [where the adjustments are meant to capture issues, such as environmental degradation, that GDP now ignores]). However, "income" is a flow variable that does not directly consider the aggregate value of the bequest which this generation will leave to its descendants. Although those now alive clearly care about the level of their own consumption, they also care (in varying degrees) about the well-being of future generations. Furthermore, although trends in average income are important, individuals are justifiably concerned about the degree to which they personally will share in the prosperity of the average, and the degree to which their personal economic future is secure. The four components or dimensions of economic well-being are, therefore:

- effective per capita consumption flows
  - includes consumption of marketed goods and services, and effective per capita flows of household production, leisure and other unmarketed goods and services
- net societal accumulation of stocks of productive resources
  - includes net accumulation of tangible capital, housing stocks and consumer durables, net changes in the value of natural resources stocks; environmental costs, and net change in level of foreign indebtedness; ideally also includes net accumulation of human capital, social capital, and research and development (R&D) investment
- income distribution (poverty and inequality)
  - includes the intensity of poverty (incidence and depth) and the inequality of income
- economic insecurity
  - economic security from job loss and unemployment, illness, family breakup, poverty in old age.

A fuller discussion of the rationale for this framework of consumption, accumulation, distribution and insecurity can be found in Osberg (1985a). We distinguish these four main dimensions of economic well-being to enable persons with differing value judgements (e.g. a greater or lesser preference for intergenerational bequest, or for the reduction of poverty, compared to increases in average consumption) to account explicitly for those values. Each dimension of economic well-being is itself an aggregation of many underlying trends, on which the existing literature is sometimes spotty.[8]

We recognize that the SNA has, thanks to many years of development effort by international agencies, produced an accounting system for GDP which is rigorously standardized across countries. Internationally comparable statistics on other dimensions of economic well-being are far less complete. However, using GDP per capita as a measure of well-being would implicitly: 1) assume that the aggregate share of income devoted to accumulation (including the value of unpriced environmental assets) is automatically optimal, and 2) set the weight of income distribution or economic insecurity to zero, by ignoring entirely their influence. Neither assumption seems justifiable.

2.1 Average Consumption Flows

2.1.1 Marketed Personal Consumption

The starting point for this component of the index is aggregate real personal consumption per capita.[9] Estimates of personal consumption per capita, expressed in national currency units (NCU) and in constant prices (base years differ among countries) are provided in Table 1. These data have been taken from the OECD National Accounts publication. All countries experienced increases in real per capita marketed personal consumption over the 1971 to 1996 period, but there were large variations in the increase, ranging from a high of 100.2 percent in Germany to a low of 26.4 percent in Sweden. The increases in the other countries were: Norway (73.5%), UK (71.6%), Canada (63.5%), US (59.1%), Australia (58.6%).

Table 1

Components of personal consumption

	Personal consumption per capita (89–90 ncu) (A)	Index of life expectancy 1980 = 1.00 (B)	Average family size, persons (C)	Index of equivalent income 1980 = 1.00 (D)	Adjusted personal consumption per capita (80–90 ncu) E=A*B*D	Index of personal consumption 1980 = 1.00
Australia						
1971	9,308	0.960	2.68	1.000	8,940.0	0.790
1996	14,760	1.048	2.46	0.959	14,834.9	1.311
Canada						
1971	8,981	0.968	**2.82**	1.026	8,920	0.726
1996	14,682	1.045	2.51	0.969	14,865	1.210
Germany						
1971	10,590	0.963	2.12	0.963	9,819	0.704
1996	21,412	1.046	2.28	0.998	22,356	1.603
Norway						
1971	56,038	0.981	2.49	1.002	55,081	0.755
1996	97,203	1.033	2.19	0.942	94,618	1.297
Sweden						
1971	62,121	0.985	1.97	1.021	62,441	0.880
1996	78,500	1.042	1.85	0.988	80,868	1.140
United Kingdom						
1971	3,714	0.984	3.25	1.107	4,046	0.907
1996	6,374	1.052	2.55	0.976	6,546	1.467
United States						
1971	10,078	0.965	2.98	1.076	10,459	0.868
1996	16,031	1.033	2.54	0.990	16,381	1.359

Note: NCU = National Currency Units

Sources: Personal Consumption per Capita – National Accounts, Main Aggregates, Volume 1; Population – OECD Health Data 98 CD-ROM, "A Comparative Analysis of 29 Countries"; Life Expectancy – OECD Health Data 98 CD-ROM, "A Comparative Analysis of 29 Countries"; Average Family Size – LIS Database. Data in bold calculated from LIS microdata database, data for other years interpolated or assumed to equal data for first or last year of period with available data.

Appendix Tables: A1, A2, A3.

Adjustments to Marketed Personal Consumption Flows

The SNA provides a strong basis for estimating the consumption of marketed goods and the cost of providing government services, and there have been enough studies of the value of household production to enable some confidence as to the range of reasonable values. Estimates are more imprecise when one considers the value of some other factors that also influence consumption flows, such as leisure, regrettables, the underground economy and life expectancy. These factors are discussed below, with approximate estimates of their value, in some cases. At this stage in the development of the index of economic well-being, our preference is to include, rather than exclude, imprecise measures. Since omitting a variable would implicitly set its value to zero, an imprecise measure is likely to embody a smaller error than omitting a variable. However, there is no estimate available at all for some countries, and omission is sometimes unavoidable.

The underground economy: Earlier versions of the index of economic well-being for Canada and the US factored in estimates of the underground economy. These estimates were based on benchmark estimates by Statistics Canada, the Bureau of Economic Statistics, and the trend in the share of the self-employed in total employment, on the argument that the self-employed have greater opportunity to hide income than paid workers. Since there always has been some level of "underground" activity, the issue for the measurement of trends in well-being is whether or not the prevalence of the underground economy has changed substantially over time. Rising tax rates may have increased the incentive to go underground, but the increased penetration of franchise systems in the small business sector and the greater computerization of business records may also have made it more difficult to escape detection by tax authorities.

Unfortunately, central statistical agencies currently do not produce internationally comparable estimates of the magnitude of the underground economy so it was decided to drop this adjustment for construction of the index. Although international estimates of the underground economy based on the monetary approach to the underground economy are available, these estimates were judged too high to be credible.

The Value of Increased Longevity

Life expectancy has increased significantly in recent years, and we have every reason to believe that having a long life is an important component of well-being. The economic value of these extra years of life should be included in the total consumption flows of individuals, since presumably people care both about how much they consume per year, and how many years they get to consume it.[10]

Years of life are one thing, and years of healthy, enjoyable life are a slightly different thing. A full appraisal of the value of increased longevity should consider trends in morbidity and health-adjusted life expectancy (HALE),[11] as well as easier-to-measure trends in longevity. However, in considering either, one has to face the issue that the value of more years of life may look very different, the closer one actually is to death. Changes in life expectancy are occurring "in real time" and are affecting the well-being of all now alive. In aggregating over the population now alive, one is aggregating over individuals at very different points in the life course. Although the economist's reflex is to consider the discounted value of lifetime utility, it may be highly problematic to view the value of additional years of life as discounted to the point of view of a teenager. For the purposes of this paper, we adopt the simple expedient of considering an increase in consumption per year or consumption for an increased number of years to be equivalent (i.e. we add to consumption flows in each year the percentage increase in average life expectancy).[12] However, we do recognize the crudity of this measure of an existential issue.

Data on life expectancy for the 14 OECD countries are taken from the OECD Health Data CD-ROM and are given in Table 1. Between 1971 and 1996, all countries enjoyed increased life expectancy, with percent increase given in brackets: Australia (9.1%), Canada (7.9%), Norway (5.3%), Sweden (5.8%), UK (6.9%) and the US (7.0%). For all years after 1971, personal consumption per capita is adjusted upward by the increase in life expectancy relative to 1971.[13]

Reduced Economies of Scale in Household Consumption

When individuals co-habit in households, they benefit from economies of scale in household consumption. There is a large literature on the estimation of "equivalence scales," which attempt to account for the magnitude of such economies of scale in households of different sizes.[14] When comparing the average effective consumption of individuals over time, the implication is that as households have shrunk in average size, economies of scale have been lost. Trends in average per capita consumption should, therefore, be adjusted for the average loss over time of economies of scale in household consumption.

Since economies of scale diminish in family size, the extent of change in economies of scale depends on where change occurs in the distribution of family sizes.[15] Data on average family size were taken from the Luxembourg Income Study micro-data tapes. Unfortunately, estimates were available only for the years tapes were available. The average family size for the most recent year available was: Australia 2.46 (1994); Canada, 2.51 (1994); Norway, 2.19 (1995); Sweden, 1.85 (1992); UK, 2.55 (1986); and the US, 2.58 (1997). All countries have experienced a long-term decline since the 1970s in average family size.

The "LIS" (Luxembourg Income Study) equivalence scale (i.e. the square root of family size) has been applied to average family income to construct an index of equivalent family income (1981 = 100), which is used to adjust personal consumption per capita. The UK had the largest downward adjustment in 1996 relative to 1971 (10.8%).

Regrettables and Intermediate Consumer Goods

It can be argued that certain types of economic activity included in the GDP do not contribute to economic welfare, but rather are defensive expenditures, or intermediate inputs that individuals make to be able to produce or consume. The costs households pay to commute to work are considered in the GDP to be part of household consumption, but the expenses which firms incur to bring materials to the work site are seen as an intermediate input in production. Since intermediate inputs in the business sector are netted out in the calculation of value added, it can be argued that similar expenditures by households should be subtracted from marketed consumption to obtain a better estimate of true consumption flows. Similarly, if the good that individuals want to consume is "a crime-free street," but it now takes a greater expenditure on police services to produce that good, an increase in police expenditures that serves only to maintain the crime rate unchanged should not be counted as an increase in (public sector) consumption.

In our papers estimating the index of economic well-being for Canada and the US (Osberg and Sharpe 1998, 1999), estimates for regrettables were subtracted from personal consumption after the adjustments for the underground economy, family size and life expectancy. However, because of the extensive data requirements involved in estimating these costs, this adjustment has not been made in constructing the index of economic well-being presented in this paper. Expenditure on regrettables was only 12.0 percent of personal consumption in 1996 in Canada, and (more importantly) it has **shown no trend over time**. Hence, exclusion of such expenditure from the index of economic well-being developed in this paper may not have a major effect on the level of personal consumption and its trend.

Differences in "Leisure"

Among OECD countries, there are major differences in both the initial level and trends over time in the average annual number of hours worked. Given these differences, level and growth rate comparisons of economic well-being are affected by working time differences. In this paper, we want to compare economic well-being over time and across countries, but we have little good data on "leisure." Ideally, one would like estimates of the proportion of non-market time that is spent in home production and the proportion of market remunerated time that consists of on-the-job leisure, to account for changes in the pace of work, both at home and in the workplace. Such measures are, however, infrequently available for any one country and difficult to compare across countries. We, therefore, proceed by standardizing for hours of paid work in relative, not absolute, terms, where the benchmark is the average annual hours worked per adult of working age in the US in 1980.

Unlike the Measure of Economic Welfare (Tobin and Nordhaus 1972), no attempt is made here to define leisure activities, estimate the amount of leisure enjoyed, and place a value on this total leisure time. Rather, we adjust the value of consumption for differences in paid hours **relative to a benchmark**, with countries having average annual hours worked less than the benchmark (hours of work = average hours in the US in 1980) having a positive adjustment to consumption and countries having more working time than the benchmark having a negative adjustment. Within the US, years with fewer hours worked than those in the benchmark year have positive adjustments and those with more hours worked, negative adjustments.

Our methodology is equivalent to saying that at the margin, individuals ascribe a value equal to the after-tax average wage to changes in non-working time that are not due to unemployment fluctuations. By comparing changes in working time to a benchmark level, we avoid the necessity of placing a monetary value on infra-marginal hours of leisure, which might be highly problematic.

Estimates of relative working time per person employed are adjusted for the employment/working age population ratio to provide estimates of relative non-working time on a working age population (15–64 years) basis to account for differences in employment/population ratios across countries. These estimates are then valued at the after-tax wage rate to provide estimates of the value of relative non-working time per working age person. This figure is then adjusted by the working age population/total population ratio to control for differences in demographic structures across countries. This amount, expressed in constant prices of the national currency, is then added to consumption flows to produce a working time-adjusted estimate of consumption relative to the US benchmark. However, unemployment does not constitute leisure. To account for involuntary leisure, we subtract average annual hours of unemployment per working age person from the relative non-working time estimate.

There are very large differences in working time per employee across countries, ranging in 1980 from a high of 2003 hours per person employed in Spain to a low of 1439 in Sweden (71.8% of those in Spain).[16] The US had the second highest average annual hours worked at 1883 hours per year. Between 1980 and 1997, most of the countries on which we have data experienced declines in working time, while two countries, Sweden and the US, experienced increases. There are also large international differences in the employment/working age population ratio[17] (the employment rate). This ranged in 1980 from a high of 79.7 percent in Sweden to a low of 50.5 percent in Spain, which reflects differences in unemployment rates and (more importantly) labour force participation rates.

Annual average hours worked per working age person (15–64 years) are the product of the employment/working age population ratio and average annual hours per person employed. For economic well-being, it is the amount of working time (relative to the benchmark) for the total working age population that is relevant, not just that of the working population. Some countries with high hours per person employed (e.g. Spain) have low employment rates and certain countries with low hours per person employed have high employment rates (e.g. Sweden). Since these country differences are partially offsetting, the variation across countries in this measure of hours is less than in hours worked for person employed.

If we are to compare the gains, at the margin, from additional market work compared to either leisure or home production, we would like to estimate the total "tax wedge" between taxed returns to time in the market and untaxed returns to leisure or home production. For this purpose, we need the sum of sales and income taxes. The share of general government current receipts in nominal GDP is used as the tax rate in the calculation of after-tax wages[18] of labour compensation. In 1980, this tax rate ranged from a high of 48.2 percent in Norway to a low of 30.0 percent in the US.

Average annual hours of non-working time relative to the 1980 US benchmark are calculated as the difference between a country's average annual hours worked per working age person in a given year and the 1980 figure for the US (1225 hours). By 1997, per adult working hours in the US were 204 hours above their 1980 level. Between 1980 and 1997, increased non-working hours per working age person totalled 54 hours in Norway, 52 hours in the UK and 38 hours in Canada. Since some of these changes are large (204 hours is equivalent to 4 hours per week), they represent substantial changes in well-being, which should be reflected in a reasonable measure of economic progress. However, since leisure hours receive zero valuation in GDP accounting, neither the declines nor the increases are reflected in GDP per capita.

Estimates of the imputed value of non-working time per working age person are expressed in constant prices in NCUs. These estimates are calculated as the product of the average annual number of hours of non-working time per working age person relative to the US 1980 benchmark[19] and the after-tax hourly compensation. Because we use NCUs (as opposed to common currency units), and because we are evaluating differentials at the margin, level comparisons of the aggregate value of non-working time are not possible.

In 1980, the ratio of the working age population (15–64 years) to the total population ranged from 67.1 percent in the US to a low of 52.1 percent in Germany. These variations reflect differences in the relative size of the dependent population (persons under 15 and over 65) across countries. We estimate the imputed value of non-working time on a per capita basis, as opposed to a per working age population basis. This adjustment is necessary because the index of economic well-being calculates consumption flows on a per capita basis. The figures are calculated as the product of the imputed value of non-working time per working age person and the ratio of the working age population to the total population.

A strong case can be made that some hours of unemployment, which are included in non-work or leisure time, are not by choice and do not contribute to economic well-being. Indeed, if there are psychological costs to unemployment, such hours may have strong disutility associated with them (Clark and Oswald 1994). We cannot, in this paper, provide estimates of the negative utility of unemployment time, or the partial value of such time. As an approximation, however, in the calculation of the imputations for the value of non-working time, we can deduct hours of unemployment[20] (i.e. assign such hours zero value).

In 1980, average annual hours of unemployment per working age person averaged 94 in the US. Between 1980 and 1997, average annual hours of unemployment increased in all countries except the US where it fell to 76. Annual average hours of labour supply per working age person are then calculated where unemployment is added to hours of work to give adjusted hours of labour supply. Average annual hours of non-working time are then calculated relative to the 1980 US benchmark of 1319 hours of labour supply.

The three components of per capita consumption flows (adjusted personal consumption, government consumption, and the imputation for non-working time) are summed to total consumption flows adjusted for hours worked. As a share of total per capita consumption flows, the imputation for relative non-working time based on the unemployment adjustment as a share of total consumption in 1996 was: (1996 share without unemployment adjustment in parentheses) 5.9 percent for Norway (4.7%), 1.0 percent for Sweden (1.0%), 0.4 percent for Canada (1.6%) and -7.4 percent for the US (-8.0%).

2.1.2 Government Services

The provision of non-marketed or heavily subsidized services by the government is part of the consumption flow. Current expenditure by all levels of government, including defence and capital consumption allowances, but excluding debt service charges and transfer payments (which influence marketed consumption), are used. These data were taken from the OECD national accounts, expressed in constant prices in NCUs.

The importance of government final consumption expenditures relative to personal adjusted consumption expenditures differs markedly among OECD countries. In 1996, it ranged from a high of 54.2 percent in Sweden to a low of 24.3 percent in the US. The figures for the other countries in descending order of the relative importance of government expenditure were: Norway (41.5%), UK (32.7%) and Canada (29.1%). In addition, over the 1971 to 1996 period there were major differences in the rate of growth of real per capita government final consumption expenditures, ranging from a low of 16.4 percent for the US to Norway (126.8%), Sweden (46.1%), UK (42.4%) and Canada (29.1%).

2.1.3 Unpaid Work

Unpaid work contributes to economic welfare and thus should in principle be included in an index of economic well-being. Unpaid work consists of both household work and volunteer work.[21] Statistics Canada (1996) has produced estimates of unpaid work for Canada,[22] and these estimates were incorporated into the original index of economic well-being developed for Canada (Osberg and Sharpe 1998). Because of the unavailability of internationally comparable estimates of the value of unpaid work for countries other than Canada, this component has not been incorporated into the index of economic well-being for OECD countries developed in this paper.

2.1.4 Total Consumption Flows

Total per capita consumption is defined as the sum of personal consumption (adjusted for changes in average household size and life expectancy), government services and the adjusted relative value of leisure.

Between 1980 and 1996 (since leisure adjustments are relative to 1980, this year will be used as the base), the increase in the real per capita total consumption flows has ranged from a low of 9.6 percent in Sweden to 37.8 percent in the UK, 39.4 percent in Norway, 18.9 percent in the US and 16.9 percent in Canada.

2.2 Accumulation, Sustainability and the Intergenerational Bequest

In our view, measurement of trends in well-being should include consideration of changes in the well-being of generations yet unborn. This consideration of future generations can be justified in one of two ways: that those now living care about the well-being of future generations or on the grounds that a concept of "society" should include both present and future generations. Either way, wealth accumulation by this generation will increase the bequest left to future generations, and is an important component of well-being.[23] We emphasize that this component of economic well-being consists of those stocks of real productive assets that can generate real income for future generations – not the financial instruments that will determine the **allocation** of the returns from those assets. As Osberg (1998a) discusses in more depth, financial "generational accounting" techniques focus on the distributional impact of government debt – but in this section we are concerned with the real accumulation of productive assets. It is the stocks of "wealth" left to the next generation, broadly conceived to include environmental and human resources as well as physical capital stock, which will determine whether a society is on a long-run sustainable trajectory of aggregate consumption, irrespective of the distribution of those consumption flows at the individual level.

2.2.1 Physical Capital Stock

The physical capital stock includes residential and non-residential structures, machinery, and equipment in both the business and government sector. The greater the capital stock, the greater the future productive capacity and future potential consumption flows, and economic well-being. The capital stock data are based on the perpetual inventory method where investment flows are accumulated over time, with depreciation rates applied to the different assets.

Data for the current net fixed capital stock, expressed in constant prices of NCUs, have been taken from the OECD publication *Flows and Stocks of Fixed Capital* and are given in Table 2. It is assumed that the estimates are internationally comparable, although the use of different depreciation rates by statistical agencies may reduce comparability for both level and rate of growth comparisons.[24] Between 1980 and 1996, the increase in the fixed capital stock, on a per capita basis, was UK (34.5%), Norway (33.6%), Canada (27.4%), Sweden (26.7%), US (24.3%) and Australia (20.8%).

2.2.2 Research and Development Capital Stock

Closely related to the physical capital stock is the concept of the R&D capital stock. In an era of rapid technological change, expenditure on R&D is a crucial ingredient in the ability of society to innovate and create wealth. Statistical agencies do not produce R&D stock data, but OECD data on annual flows of total business enterprise expenditure on R&D can be accumulated into a stock of R&D capital valued at cost of investment – a depreciation rate of 20 percent on the declining balance is assumed.

Between 1980 and 1996, the rate of change in the per capita real

Table 2

Stocks of wealth, per capita, 1990ncu constant prices

	Total net of stock fixed capital per capita	Stock of total business enterprise expenditure on R&D	Total net international investment position per capita	Human capital stock	Greenhouse gas emission cost per capita	Total real per capita wealth	Index of total wealth 1980 = 1.00
Australia							
1971	42,449.5	244.9	-27,493.3	18,848.7	-394.7	33,655.1	0.5165
1996	64,626.1	795.1	-15,125.8	25,816.5	-430.2	75,681.7	1.1616
Canada							
1971	16,180.2	355.0	**-5,150.5**	19,065.5	-358.5	11,384.7	0.8236
1996	26,154.0	1,016.7	-10,128.9	25,048.3	-414.9	17,041.9	1.2329
Germany (1000s NCU)							
1971	55,892	6.130	2.975	34.0	-0.448	98,569	0.8301
1996	100,736	5.803	2.847	42.2	-0.611	150,994	1.2716
Norway (1000s NCU)							
1971	317.9	3.324	-128.8	143.4	-2.250	333.5	0.5874
1996	605.7	8.056	-14.6	193.6	-3.561	789.2	1.3902
Sweden (1000s NCU)							
1971	394.1	–	-59.3	165.4	-2.678	497.6	0.9380
1996	486.6	–	-66.0	178.2	-2.735	596.0	1.1235
United Kingdom (1000s NCU)							
1971	24.5	0.439	1.953	9.8	-0.149	36.6	1.0997
1996	29.6	0.649	0.352	12.4	-0.175	42.8	1.2876
United States (1000s NCU)							
1971	38.2	1.316	3.745	17.8	-0.377	60.6	0.8740
1996	59.3	2.073	-2.676	22.1	-0.408	80.4	1.1599

Note: Net international investment position expressed in current US$ recalculated into net international investment position, Constant 1999 NCU with gross domestic product price deflator, 1999=100, and NCU/US$ exchange rates.

Sources: Total Net Stock of Fixed Capital – Flows and Stocks of Fixed Capital, OECD, 1971–1996.

Stock of Total Business Enterprise Expenditures on R&D – Research and Development in Industry, OECD, 1976–1997, 1999 Edition.

Net International Investment Position – International Financial Statistics Yearbook, IMF, 1998.

Greenhouse Gas Emission Cost Per Capita – Appendix Table CO_2.

Appendix Tables: A1, A6, A8, A9, A10.

business enterprise R&D stock for business enterprises ranged from an increase of 233 percent in Australia to a decline of 11 percent in Germany. The rate of increase in the other countries (in descending order of magnitude) was Norway (119%), US (91%), Canada (27%) and

UK (20%).[25]

2.2.3 Value of Natural Resource Stocks

Current consumption levels could be increased by running down stocks of non-renewable natural resources or by exploiting renewable resources in a non-sustainable manner, but this would be at the cost of the consumption of future generations. A key aspect of the wealth accumulation component of economic well-being is net changes in the value of natural resources.

From an intergenerational perspective, it is the value of the natural resources, not their physical extent, which counts. The valuation of these resources poses conceptual problems, but estimates certainly are possible.[26] Statistics Canada (1997) has recently provided both physical and value estimates of natural resources such as forests, energy reserves, and minerals. These estimates, as well as estimates produced by the US Bureau of Economic Analysis, were used in the construction of the index of economic well-being for Canada and the US (Osberg and Sharpe 1998, 1999).

Unfortunately, there are currently no internationally comparable time series estimates of the value of natural resources for OECD countries, so this component of wealth stocks has not been included in the index of economic well-being developed in this paper.

The World Bank (1997) has produced estimates for one year (1994) of natural capital or "the entire environmental patrimony of a country" for nearly 100 countries and plans to release estimates for a second year (1998) in 2000. Natural capital is defined to include pastureland, cropland, timber resources, non-timber forest resources, protected areas and sub-soil assets. However, the short length of this time series will preclude its use in the index of economic well-being except for the period after 1994.

Work Bank estimates of natural capital for OECD countries, on a per capita basis expressed in 1994 US dollars, were Canada ($36,590), Australia ($35,340), Norway ($30,220), US ($16,500), Sweden ($14,590) and UK ($4,940).

2.2.4 Stocks of Human Capital

The human capital accumulated by the workforce generates both current and future income. Trends in the stock of human capital, including both formal educational attainment levels and on-the-job training, are important determinants of current and future economic well-being. School retention and participation in post-secondary education have increased dramatically in many countries over the last three decades, and there is a strong relationship between educational attainment and individual income.

One approach to the valuation of human capital is to estimate the returns associated with different levels of educational attainment of the population and compute the implicit present discounted value of education (Jorgenson and Fraumeni 1992). A major problem with this methodology, however, is that it imputes to education stocks any differential in the structure of wages that is correlated with education. A second, input-based approach is to apply the perpetual inventory method of estimating the physical capital stock based on investment flows and depreciation assumptions to public and private expenditure on education and training (Kendrick et al. 1976). A third approach to human capital accounting is to develop methods for systematically evaluating and recording knowledge assets acquired through experience, education and training (OECD 1996).

The approach to measuring human capital used in the construction of the index of economic well-being for Canada and the US (Osberg and Sharpe 1998, 1999) was admittedly crude and incomplete.[27] The cost per year of education expenditures at the primary, secondary and post-secondary levels was estimated. Yearly estimates of the distribution of education attainment in the population were then used to compute the total cash cost of production of human capital in education.

The same approach has been followed for the OECD countries. OECD data on the educational attainment of the 25- to 64-year-old population and expenditure per student (available in both local currency and US dollars) for early childhood, primary, secondary, non-university tertiary and university-level education were used to estimate the per capita stock of human capital.

To distinguish clearly inter-country differences in the quantity of education obtained, as opposed to differences in its cost of production, we apply a common cost base (the cost of education in the US) to all countries.

2.2.5 Net Foreign Indebtedness

We do not count the gross level of government or corporate debt as a "burden" on future generations, and we do not count as part of the intergenerational bequest the value of paper gains in the stock market.[28] In general, financial instruments represent both assets to their holders and liabilities to their issuers. The distribution of such assets/liabilities will play a major role in allocating the real returns to the future capital stock, but the issue at this point is the aggregate value of the intergenerational bequest.

However, net debt to foreigners is another issue. Since interest payments on the net foreign indebtedness of citizens of one country to residents of other countries will lower the aggregate future consumption options of those citizens, increases in the level of foreign indebtedness reduce economic well-being within a given country.

Estimates of the net investment position, expressed in current US dollars, are published in the International Monetary Fund's *Inter-*

national Financial Statistics Yearbook. These estimates have been converted to current price national currencies at market exchange rates and then deflated by the GDP deflator and adjusted for population to obtain real per capita estimates in the net international investment position, expressed in NCUs (Table 2).

2.2.6 State of the Environment and National Heritage

Like the excess depletion of natural resources, current consumption can be increased at the expense of the degradation of the environment, reducing the economic well-being of future generations. Consequently, changes in the level of air and water pollution should be considered an important aspect of the wealth accumulation.

Countries pass on from generation to generation both a natural and human-made national heritage. If this heritage were damaged, the economic well-being of future generations would be reduced. Since it is very difficult, if not impossible, to put a monetary value on, for example, the pristine condition of national parks or historic buildings, there will be no attempt to set an aggregate value to these assets. However, the issue of **trends** in well-being is the **change** in such assets, which is easier to measure and for which indicators of environmental quality can be developed.

Osberg (1985b) has argued that heritage preservation laws can be seen as an optimal intergenerational contract, which constrains the present generation not to despoil irreplaceable assets. In the presence of such constraints, the current generation still has to decide how large a bequest to future generations to leave in the form of replaceable assets, but the "national heritage" remains untouched. As a consequence (like the family heirloom that is never priced because it will never be sold), trends in economic well-being can be evaluated without placing an explicit monetary value on irreplaceable environmental and cultural assets.

Probably the best-known environmental change is global warming arising from increased emissions of greenhouse gases, the most common of which is carbon dioxide (CO_2) emissions. Fortunately, data are available on these emissions and it is possible to estimate the costs of these emissions. These costs can then be subtracted from the stock of wealth to obtain an environmentally adjusted stock of wealth.

The conceptual issues to be dealt with in estimating the costs of CO_2 emissions include whether the costs should be viewed from a global, national or sub-national perspective, whether the costs increase linearly with the levels of pollution, whether the costs should be borne by the producer or receptor of trans-border emissions, and whether costs should vary from country to country or be assumed the same for all countries. Since global warming affects all countries, we estimate world total costs of emissions and allocate these costs on the basis of a country's share of world GDP.

Fankhauser (1995) has estimated that the globalized social costs of CO_2 emissions (with no adjustment for different national costs) at $20 US per ton in 1990. World Bank researchers (Atkinson et al. 1997) have applied this number to CO_2 emissions in developed countries to estimate the value of the loss of environmental services as a proportion of output and the measure of genuine saving.

According to data from the International Energy Agency, world CO_2 emissions in 1997 were 22 636 millions of metric tons. Based on the $20 US per ton cost of CO_2 emissions, the world social cost of CO_2 emissions was $452,720 million. This amount was allocated on the basis of a country's share of nominal world GDP, expressed in US dollars. It was then converted into national currency at the purchasing power parity exchange rate and divided by population. As these costs represent a loss in the value of the services provided by the environment, they can be considered a deduction from the total stock of wealth of the society. For example, in 1997, per capita stocks of wealth in Canada were reduced by $415 Cdn because of the social costs imposed by CO_2 emissions according to this methodology.

2.2.7 Estimates of Total Wealth

As the estimates of the physical capital stock, the R&D capital stock, net foreign debt and environmental degradation are expressed in value terms, they can be aggregated and presented on a per capita basis (Table 2). Net foreign debt per capita is a negative entry, while the social costs of CO_2 emissions are subtracted from the stocks of wealth.

For the 1980 to 1996 period, estimates for the five components of the wealth stock included in this paper are available for various countries (Table 2). The rate of change for per capita real wealth stocks in national currency at constant prices for these countries ranged from an increase of 16.0 percent in the US to Norway's 39.2 percent. The UK (28.8%), Canada (23.3%) and Australia (16.2%) were intermediate cases.

2.3 Income Distribution – Inequality and Poverty

The idea of a "social welfare function" which is a positive function of average incomes and a negative function of the inequality of incomes has a long tradition in welfare economics. However, in measuring the level of social welfare, the exact relative weight to be assigned to changes in average incomes, compared to changes in inequality, cannot be specified by economic theory. Since Atkinson (1970), it has been recognized that the measurement of inequality itself depends on the relative value which the observer places on the utility of individuals at different points in the income distribution. For a "Rawlsian," only changes in the well-being of the least well-off matter, but others will admit some positive weight for the income gains of the non-poor,[29] and will assign some negative weight to inequality among the non-poor.

Since the economic well-being of the population is affected by inequality in the distribution of income and by the extent of poverty,[30] there are two issues: 1) one's perspective on the importance of inequality/poverty compared to trends in average income, and 2) one's view of the relative weight to be placed on poverty compared to inequality. We, therefore, suggest that a compound sub-index to recognize explicitly these issues would place some weight (β) on a measure of inequality in the aggregate distribution of income and some weight ($1-\beta$) on a measure of poverty.

The most popular measure of inequality in the distribution of income is undoubtedly the Gini index. For the purposes of the construction of the index of economic well-being, we have chosen the Gini coefficient of after-tax household income.[31] For the most recent year for which data are available for each country (Table 3), income inequality and the Gini coefficient was largest (and hence income inequality greatest) in the US (0.387) and lowest in Finland (0.243). The Gini coefficients for LIS countries can be found in Osberg and Xu (2000).

Recently, Osberg and Xu (1997) have noted that the Sen-Shorrocks-Thon measure of poverty intensity is both theoretically attractive as a measure of poverty, and also convenient, since it can be decomposed as the product of the poverty rate, the average poverty gap ratio and the inequality of poverty gap ratios. Furthermore, since the inequality of poverty gap ratios is essentially constant, poverty intensity can be approximated as twice the product of the poverty rate and the average poverty gap ratio. The poverty rate is the proportion of persons who fall below the poverty line, defined here as one-half the median equivalent after-tax family income. The poverty gap ratio is defined as the percentage gap between the poverty line and the income of those below the poverty line.

The poverty rate varies greatly among the countries for which LIS data are available (Table 3). For the most recent year for which microdata tapes are available for each country, it ranged from a high of 18.0 percent in the US to Australia (17.5%), Canada (12.4%), UK (9.7%), Norway (9.2%) and Sweden (8.9%). There was much less variation across countries in the average poverty gap ratio. The average poverty gap ratio was: Sweden (36.6%), US (34.9%), Canada (31.0%), Norway (28.5%), UK (28.5%) and Australia (27.7%).

The overall index of equality is a weighted average of the indices of poverty intensity for all units or households and the Gini coefficient, with the weights 0.75 and 0.25, respectively. The index is multiplied by -1 in order to reflect the convention that increases are desirable.

Unfortunately, the LIS database allows calculation of a long-time series of income distribution estimates for only a few countries. Osberg (1999) examines long-run trends in income distribution in the US,

Table 3

Index of economic equality

	Gini coefficient (A)	Poverty rate (B)	Poverty gap (% of poverty line) (C)	Poverty intensity D=B*C	Poverty intensity index D′	Gini coefficient (income after tax), index A′	Overall index of inequality E=-1*(D′*0.75+A′*0.25)
Australia							
1971	0.3040	15.48	26.73	0.0414	1.0000	1.0000	-1.0000
1996	0.3378	17.48	27.66	0.0484	1.1685	1.1112	-1.154
Canada							
1971	**0.2440**	**20.44**	**35.33**	0.0722	1.5204	0.7711	-1.333
1996	0.3019	0.3019	30.99	0.0383	0.8068	0.9541	-0.844
Germany							
1971	0.3034	13.28	30.79	0.0409	1.9204	1.1768	-1.735
1996	0.3069	8.55	30.58	0.0261	1.2271	1.1904	-1.218
Norway							
1971	5.71	36.85	0.2487	0.0210	0.9564	0.9947	-0.966
1996	9.15	28.53	0.2659	0.0261	1.1866	1.0636	-1.156
Sweden							
1971	0.2401	7.21	36.02	0.0260	1.3122	1.1226	-1.265
1996	0.2530	8.65	36.64	0.0317	1.6024	1.1832	-1.498
United Kingdom							
1971	0.2909	10.07	16.74	0.0169	0.9201	1.0021	-0.941
1996	0.3430	13.20	28.49	0.0376	2.0512	1.1816	-1.834
United States							
1971	0.3446	17.95	34.81	0.0625	0.9993	1.0398	-1.009
1996	0.3853	18.34	34.94	0.0641	1.0250	1.1629	-1.060

Notes: Poverty rates are the head count ratios calculated on the base of poverty line - one half of median equivalent income.

Median equivalent income is the median of net family income after taxes adjusted by equivalence scale.

Square root of family size was used as the equivalence scale. Persons with negative or zero income were excluded from calculations. All families category includes one-person households.

Poverty gap is the ratio of the gap (between poverty line and mean equivalent income of those under poverty line) to poverty line.

Data in bold calculated from LIS micro database, data for other years interpolated or assumed to equal data for first or last year of period with available data.

Source: LIS Database, Poverty Rate and Gini coefficients for United Kingdom 1991, 1995 are from L. Osberg "Long Run Trends in Economic Inequality in Five Countries," October 1999.

UK, Canada, Sweden and Germany. In Table 3, values of the income distribution and poverty variables in the years before the first LIS estimate for that country are assumed equal to the estimate for the first year of LIS data and the values for the years after the last LIS estimate are assumed equal to the estimate of the last year of LIS data. This is obviously an inadequate methodology and may lead to unreliable estimates for countries with short-time series of LIS estimates.[32]

2.4 Insecurity

If individuals knew their own economic futures with certainty, their welfare would depend only on their actual incomes over their lifetimes, since there would be no reason to feel anxiety about the future. However, uncertainty about the future will decrease the economic welfare of risk-averse individuals. Individuals can try to avoid risk through social and private insurance, but such mechanisms do not completely eliminate economic anxieties, which have to be considered a subtraction from well-being.

Although public opinion polling can reveal that many feel themselves to be economically insecure, and that such insecurity decreases their subjective state of well-being, the concept of economic insecurity is rarely discussed in academic economics.[33] Consequently, there is no generally agreed definition of economic insecurity. Osberg (1998b) has argued that economic insecurity is, in a general sense, "the anxiety produced by a lack of economic safety – i.e. by an inability to obtain protection against subjectively significant potential economic losses" (p. 17). In this sense, individuals' perceptions of insecurity are inherently forward looking, the resultant of their expectations of the future and their current economic context – hence, only imperfectly captured by measures such as the ex post variability of income flows.[34] Ideally, one would measure trends in economic security with data which included (for example) the percentage of the population who have credible guarantees of employment continuity and the adequacy of personal savings to support consumption during illness or unemployment. However, such data are not widely available. For these reasons, rather than attempt an overall measure of economic insecurity, this paper adopts a "named risks" approach, and addresses the change over time in four key economic risks.

Over 50 years ago, the UN Universal Declaration of Human Rights stated:

> Everyone has the right to a standard of living adequate for the health and well-being of himself and of his family, including food, clothing, housing and medical care and necessary social services, and the right to security in the event of unemployment, sickness, disability, widowhood, old age or other loss of livelihood in circumstances beyond his control. [Article 25][35]

For this paper, we construct measures of the percentage change over time in the economic risks associated with unemployment, illness, "widowhood" (or single-female parenthood) and old age. In each case, we model the risk of an economic loss associated with the event as a conditional probability, which can itself be represented as the product of a number of underlying probabilities. We weight the prevalence of the underlying risk by the proportion of the population that it affects. The core hypothesis underlying the measure of economic insecurity proposed here is that changes in the subjective level of anxiety about a lack of economic safety are proportionate to changes in objective risk.

2.4.1 Unemployment

The economic risk associated with unemployment can be modelled as the product of the risk of unemployment in the population and the extent to which people are protected from the income risks of unemployment. We have taken as a proxy for the risk of unemployment changes in the employment rate (employment/population ratio). Changes in this ratio reflect changes in the unemployment rate and changes in the participation rate (both cyclical and structural). The extent to which people have been protected by unemployment insurance (UI) from the financial impacts of unemployment can be modelled as the product of the percentage of the unemployed who claim regular UI benefits, and the percentage of average weekly wages replaced by UI.

Internationally comparable data on these two variables, particularly the first, have proven very difficult to obtain. Hence, an unpublished OECD series on the gross replacement rate for the unemployed has been used in the calculation of the risk of unemployment. This series shows a markedly different trend than the Employment Insurance (EI) coverage rate for certain countries such as Canada in the 1990s.

2.4.2 Illness

Viewed from a longer term perspective, the economic insecurities associated with illness in developed economies certainly dropped considerably with the introduction of universal health insurance in many countries. We would emphasize that we do not attempt to model the psychological insecurities associated with health – just the economic risks. Recent decades have seen both substantial advances in medical technology and increased awareness of health hazards (such as Kreutzfeld-Jacob Syndrome – "mad cow disease") which were previously unimaginable. It is not clear whether subjective anxieties about health have increased or fallen as a result.

Our objective is only to model the trend in economic anxieties associated with ill health, but at this stage of our research, there is an important omission. The economic risks associated with illness are partly the risk of loss of earnings. Historically, a portion of the labour force has had some protection against such losses through sick leave provisions in their individual or collective employment contracts. One implication of a trend to short-term contract employment and self-employment in developed economies is an increase in the fraction of the population whose employment income ceases totally in the event of ill health. This paper does not attempt to model such risks. Instead, we focus on the risk of large out-of-pocket health care costs, with the risk directly proportional to the share of private medical care expenses in disposable income.

The OECD Health Data CD-ROM provides a long-time series on medical care expenses as a proportion of disposable income. For the 14 countries covered by the LIS database, medical expenses as a proportion of disposable income (excluding medical insurance premia and net of insurance reimbursement for medical expenses) ranged from a high of 14.0 percent in the US to a low of 1.1 percent in the UK in 1996. The proportion in the other countries was: Australia (5.5%), Canada (3.2%), Norway (2.0%) and Sweden (1.6%).

However, to follow the convention that increases in the sub-components of the index of economic security are improvements, we want an index of "security" and not an index of "insecurity"; hence, we multiply the risk of illness, where increases are negative for economic well-being, by –1. A negative sign, therefore, indicates that an increased negative value represents a decline in well-being (and a decreased negative value, an increase in well-being).

2.4.3 Single-Parent Poverty

When the UN Universal Declaration of Human Rights was drafted in 1948, the percentage of single-parent families was relatively high in many countries, partly as a result of the Second World War. At that point in time, "widowhood" was the primary way in which women and children lost access to male earnings. Since then, divorce and separation have become the primary origins of single-parent families. However, it remains true that many women and children are "one man away from poverty," since the prevalence of poverty among single-female-parent families is extremely high.

To model trends in this aspect of economic insecurity, we multiply (the probability of divorce) * (the poverty rate among single-female-parent families)[36] * (the average poverty gap ratio among single-female-parent families).[37] The product of these last two variables is proportional to the intensity of poverty.

We stress that in constructing a measure of the economic insecurity associated with single-parent status, we are **not** constructing a measure of the social costs of divorce. Economic well-being is only part of social well-being, and divorce has emotional and social costs (e.g. for the involved children) that are not considered here. Arguably, over time the social costs associated with divorce (e.g. stigma) have changed, as the institution of marriage itself has changed – but such issues lie well beyond the scope of this paper.

Data on divorce rates from the UN Demographic Yearbook and estimates of the poverty rate and poverty gap ratio for single-female parents were calculated from the LIS micro-data tapes. The annual divorce rate ranged in 1996 (or the most recent year before 1996 for which data are available) from a high of 4.33 percent of legally married couples in the US to 2.89 percent in the UK, 2.86 percent in Australia, 2.62 percent in Canada, 2.42 percent in Sweden and 2.28 percent in Norway.

The poverty rate for single-female parents in the most recent year (in parentheses) from LIS micro-files ranged from a high of 44.0 percent (1997) in the US to a low of 2.8 percent (1992) in Sweden. The poverty rate for single-female parents in other countries, in descending order of magnitude was Australia, 40.7 percent (1994); Canada, 40.7 percent (1994); UK, 13.8 percent (1986); and Norway, 11.3 percent (1995).

The average poverty gap ratio for single-female parents in the most recent year (same year as for the poverty rate above) from LIS files ranged from a high of 41.6 percent in Norway to a low of 18.2 percent in Sweden. The poverty gap ratio for other countries, in descending order of magnitude, was Norway (41.6%), US (39.6%), Canada (27.5%), Australia (24.5%) and UK (23.6%).

Again, to follow the convention that increases in the sub-components of the index of economic security are improvements, we want an index of "security" and not an index of "insecurity." We thus multiply the risk of single parenthood, where increases are negative for economic well-being, by –1. A negative sign, therefore, indicates that an increased negative value represents a decline in well-being (and a decreased negative value, an increase in well-being).

2.4.4 Old Age

Since income in old age is the result of a lifelong series of events and decisions, which we cannot hope to disentangle in this paper, we model the idea of "insecurity in old age" as the chance that an elderly person will be poor, and the average depth of that poverty.

The poverty rate and the poverty gap ratio for the population 65 or over were calculated from LIS micro-data files. The poverty rate for the elderly in the most recent year (in parentheses) for LIS micro-data files ranged from a high of Australia, 33.1 percent (1994) to US, 24.4 percent (1997); Norway, 12.0 percent (1995); Sweden, 6.0 percent (1992); UK, 5.4 percent (1986); and Canada, 4.8 percent (1994). The average poverty gap ratio for the elderly in the most recent year from the LIS micro-data files ranged from a low of Norway (9.3%) to Australia (27.6%), US (24.4%), Canada (13.4%), Sweden (12.7%) and UK (11.7%).

Again, to follow the convention that increases in the sub-components of the index of economic security are improvements, we want an index of "security" and not an index of "insecurity." We thus multiply the risk of elderly poverty by –1. A negative sign, therefore, indicates that an increased negative value represents a decline in well-being (and a decreased negative value, an increase in well-being).

2.4.5 Overall Index of Economic Security

The four risks discussed above have been aggregated into an index of economic security (Table 4). The aggregation weights are the relative importance of the four groups in the population, which are also in Table 4:

- for unemployment, the proportion of the population aged 15 to 64 in the total population
- for illness, the proportion of the population at risk of illness, which is 100 percent
- for single-parent poverty, the proportion of the population comprising married women with children under 18
- for old age poverty, the proportion of the population in immediate risk of poverty in old age, defined as the proportion of the population aged 45 to 64 in the total population.

The above proportions have been normalized for all years to one. For example, the weights for Canada in 1997 were the following: unemployment (0.2779), illness (0.4160), single parenthood (0.2158) and old age (0.0904).[38] Implicitly, by expressing changes as proportionate to an initial base, we are assuming that individuals habituate to a given level of background stimulus, but respond similarly to proportionate changes in stimulus.

Based on the above weights, the overall index of economic security for seven LIS countries are given in Table 4.

2.5. Estimates of Trends in the Overall Index of Economic Well-Being

2.5.1 Weighting of Components

Trends in any index are determined by the choice of variables that are included in the index, the trends in those variables and the weights these variables receive. Since the four main dimensions of average consumption, intergenerational bequest, inequality/poverty and insecurity are separately identified, it is easy to conduct sensitivity analyses of the impact on perceived overall trends of different weighting of these dimensions. For discussion purposes, our "standard" weighting gives consumption flows a weight of 0.4, wealth stocks a weight of 0.1, and equality and economic security have each been given a weight of 0.25.

As the sub-components of the consumption flows and wealth stocks are expressed in dollars, there is no need for explicit weighting. Their dollar values represent implicit weights. In terms of the inequality/poverty sub-components, a somewhat Rawlsian perspective would

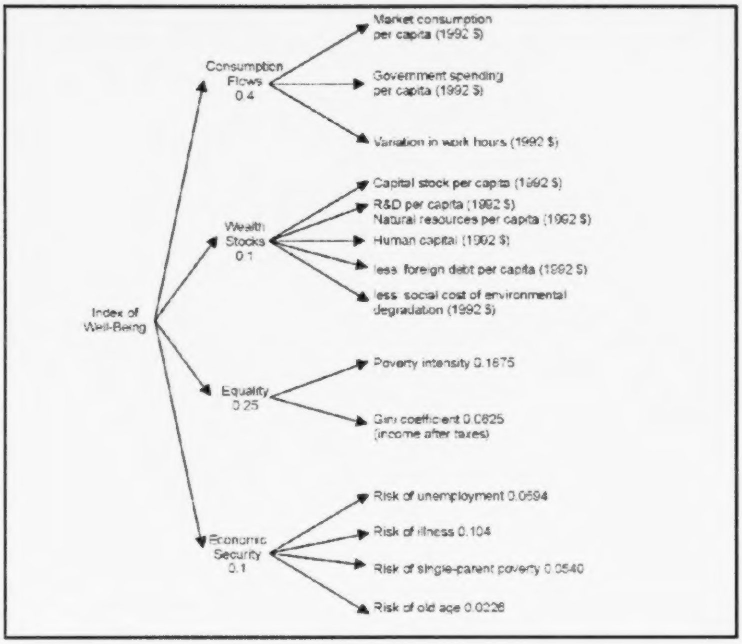
Table 4

Index of economic security

	Index 1 unemployment	Index 2 health (+2)	Index 3 women poverty (+2)	Index 4 old age (+2)	Weighted index 1 unemployment	Weighted index 2 health	Weighted index 3 women poverty	Weighted index 4 old age	Average weighted index of economic security
Australia									
1971	0.8110	1.0192	1.6292	1.0000	0.2154	0.4299	0.3745	0.0827	1.1025
1996	1.0710	0.7291	1.3656	-0.6293	0.2996	0.3058	0.2937	-0.0540	0.8450
Canada									
1971	**0.8552**	**1.0607**	1.3436	0.1515	0.2179	0.4429	0.3376	0.0116	1.0100
1996	1.0458	0.6568	1.3424	1.8814	0.2935	0.2753	0.2867	0.1630	1.0185
Germany									
1971	1.0172	1.1305	-0.3781	1.0000	0.2285	0.5106	-0.0846	0.0999	0.7545
1996	0.9254	0.6204	-5.9135	1.3096	0.2577	0.2531	-1.2509	0.1336	-0.6066
Norway									
1971	0.5607	0.9922	1.4676	1.1332	0.1489	0.4108	0.3252	0.1120	0.9969
1996	1.2901	1.1259	0.5885	1.6596	0.3543	0.4814	0.1215	0.1516	1.1088
Sweden									
1971	0.5982	0.6160	1.7592	0.8003	0.1651	0.2604	0.3442	0.0845	0.8543
1996	1.0181	0.0036	1.7717	0.7801	0.2824	0.0016	0.3232	0.0817	0.6889
United Kingdom									
1971	1.0381	1.0033	0.9829	0.0656	0.2611	0.4031	0.2472	0.0062	0.9176
1996	0.8650	0.2259	1.0955	1.1901	0.2318	0.0941	0.2412	0.1132	0.6804
United States									
1971	0.8909	1.2323	1.0882	0.9696	0.2340	0.5083	0.2590	0.0841	1.0855
1996	1.0058	0.3969	1.1736	1.3419	0.2865	0.1722	0.2279	0.1170	0.8036

assign greater importance to poverty than to overall inequality trends. On this basis,[39] a weight of 0.1877 or (=0.25*0.75) has, therefore, been given to the poverty intensity and 0.0625 (=0.25*0.25) to the Gini. In other words, poverty is given three times the weight of inequality. The sub-components of the economic security index are weighted by the relative importance of the specific population at risk

Weighting Tree


Index of Well-Being
Consumption Flows 0.4
Market consumption per capita (1992 $)
Government spending per capita (1992 $)
Variation in work hours (1992 $)
Wealth Stocks 0.1
Capital stock per capita (1992 $)
R&D per capita (1992 $)
Natural resources per capita (1992 $)
Human capital (1992 $)
less foreign debt per capita (1992 $)
less social cost of environmental degradation (1992 $)
Equality 0.25
Poverty intensity 0.1875
Gini coefficient 0.0625 (income after taxes)
Economic Security 0.1
Risk of unemployment 0.0594
Risk of illness 0.104
Risk of single-parent poverty 0.0540
Risk of old age 0.0226

in the total population (see tree diagram).

The "standard" weighting of components and sub-components of the economic well-being index are shown in the following chart.

"Standard" weighting of the index of economic well-being

(Weights of total index in parentheses)

Basic Component	Sub-Components
Consumption Flows (0.40)	Real total consumption (NCU per capita)
	Real current government spending on goods and services excluding debt service (NCU per capita)
	Adjustment for changes in leisure
Stocks of Wealth (0.10)	Real capital stock (including housing) (NCU per capita)
	Real R&D stock (NCU per capita)
	Real net foreign debt (NCU per capita)
	Real social cost of environmental degradation (CO_2 emissions) (NCU per capita)

Equality (0.25)	Poverty intensity Income inequality (Gini coefficient)
Security[40] (0.25)	Risk of unemployment Risk of illness Risk of single-parenthood poverty Risk of poverty in old age

The formula for the overall index is as follows:

$$\mathrm{IEWB} = (0.4)[C+G+UP]+(0.1)[K+R\&D+-D-ED]+[(0.1875)(LIM)+(0.0625)Gini]+[(0.0694)UR+(0.1040)ILL+(0.0540)SP+(0.0226)OLD]$$

where

IEWB=index of economic well-being

C=real per capita adjusted personal consumption

G=real per capita current government spending excluding debt charges

UP=real value of per capita unpaid labour

K=real per capita capital stock (including housing)

R&D=real per capita stock of R&D

NR=real per capita stock of natural resource wealth

HC=real per capita stock of human capital

D=real per capita net foreign debt

ED=real per capita social costs of environmental degradation (CO_2 emissions)

LIM=poverty intensity

Gini=Gini coefficient for after-tax income

UR=risk of unemployment

ILL=risk of illness

SP=risk of single-parenthood poverty

OLD=risk of poverty in old age

Table 5 shows the indexes for all four components of the index of economic well-being and the overall index. To put all the sub-components to a common base of 1, the constant 2 has been added to the index of inequality (Table 3) to convert it to an index where an increase corresponds to a rise in economic well-being.

3. Trends in the Overall Index of Economic Well-Being

We are acutely conscious that the data sources available to us are far from what we would like. We know that restricting ourselves to internationally comparable data series has meant that we have neglected issues (such as the decline in EI coverage in Canada) which are important for some countries. We also know the reliance on interpolation between the data points available in the LIS implies, necessarily, that

Table 5

Overall economic well-being index (normal sub-components weighting)

	Consumption flows 0.4 (A)	Wealth stocks 0.1 (B)	Inequality measures 0.25 (+2) (C)	Economic security 0.25 (D)	Well-being index
Australia					
1971	0.7781	0.5165	1.0000	1.1025	0.8885
1996	1.3084	1.1616	0.8458	0.8450	1.0622
Canada					
1971	0.7506	0.8236	0.6669	1.0100	0.8018
1996	1.1800	1.2329	1.1564	1.0185	1.1390
Germany					
1971	0.6936	0.8301	0.2655	0.7545	0.6154
1996	1.6564	1.2716	0.7821	0.6066	0.8336
Norway					
1971	0.7034	0.5874	1.0340	0.9969	0.8478
1996	1.3689	1.3902	0.8441	1.1088	1.1748
Sweden					
1971	0.8203	0.9380	0.7352	0.8543	0.8193
1996	1.1169	1.1235	0.5024	0.6889	0.8569
United Kingdom					
1971	0.8897	1.0997	1.0594	0.9176	0.9601
1996	1.4062	1.2876	0.1662	0.6804	0.9029
United States					
1971	0.8895	0.8740	0.9906	1.0855	0.9622
1996	1.2052	1.1599	0.9405	0.8036	1.0341

Note: Well-being index = 0.4*A-0.1*B+0.25*C+0.25*D.

we cannot detect year-to-year fluctuations in some components of our index. However, we hope that enough data remain to give a preliminary indication of trends in economic well-being from a broader perspective than that provided by GDP accounting.

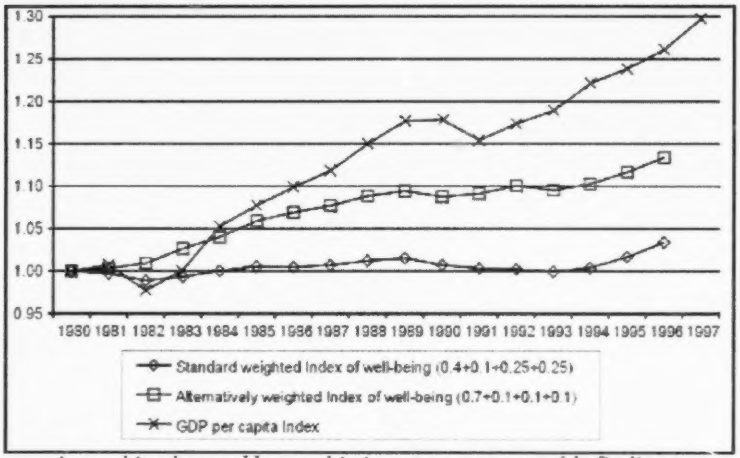
Since we want to examine the sensitivity of a measure of economic well-being to alternative possible weightings of accumulation, income distribution and insecurity, Figures 1 to 7 present both our "standard" and an "alternative" weighting. The "alternative" is much more heavily weighted to average consumption (0.7), has the same weighting on accumulation (0.1), and less heavily emphasizes income distribution (0.1) and insecurity (0.1). For each country, we compare trends in the "standard" and "alternative" indices with trends in GDP per capita.

For all countries, consideration of bequest, inequality/poverty and insecurity reduces the measured rate of growth of economic well-being, compared to the use of the GDP per capita index. Generally, the more heavily current average consumption is emphasized, the closer our index comes to GDP per capita. However, in every instance the consideration of a wider range of issues than those recognized in GDP accounting reduces the measured increase in economic well-being.

In some countries, the change in the perception of trends in well-being that a broader measure produces is striking. In the US, GDP per capita increased by approximately 30 percent over the 1980 to 1997 period, but our "standard" index is essentially flat, with a total increase of 3 percent over the period. In the UK, increases in per capita GDP were even larger (39.8%), but our "standard" weighting (which has a heavy emphasis on economic inequality and insecurity) shows a decline of about 10 percent. Both the US and the UK have been marked by a substantial increase in economic inequality over this period, and increases in money income have been limited to the top end of the income distribution (see Osberg 1999). As well, increases in money income in the US have been obtained at the cost of substantial increases in working hours. Hence, this is not an unreasonable finding.

Figure 1

United States



For the UK and Sweden, GDP per capita rose, while our "standard" index of economic well-being declined. In both cases, however, this qualitative result is quite sensitive to the relative weighting of current consumption compared to distribution and insecurity – the "alternative" index does not actually decline[41] (although it is almost flat in Swedish data). As Osberg and Xu (2000) note, recent years have seen an increase in Swedish poverty intensity, so it is not surprising that an index which weights heavily trends in income distribution and inse-

Figure 2

United Kingdom

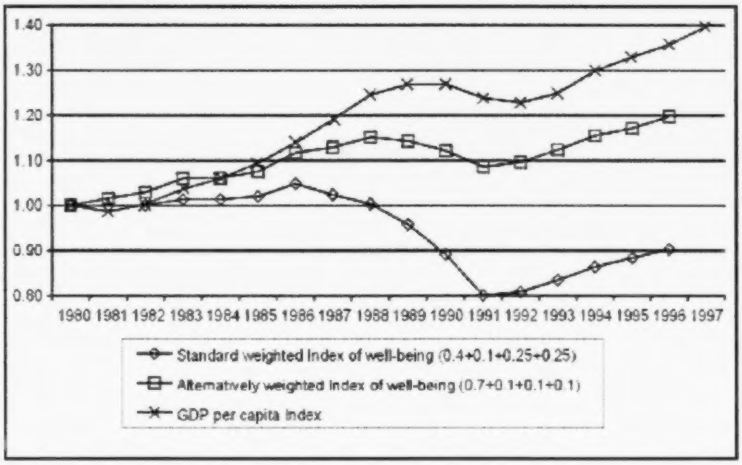
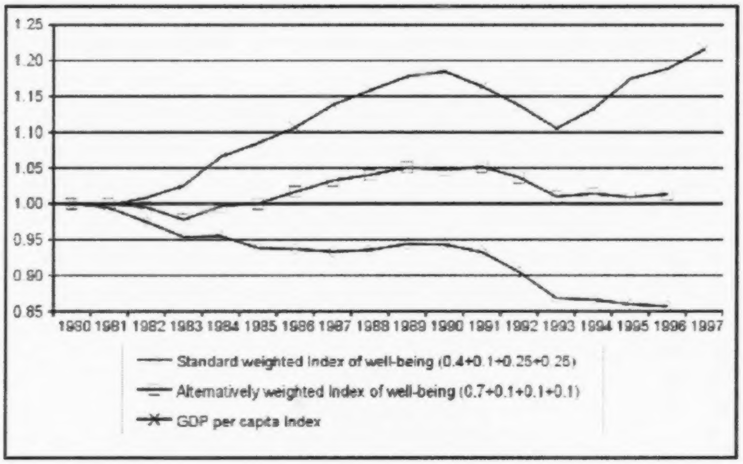


Figure 3

Sweden

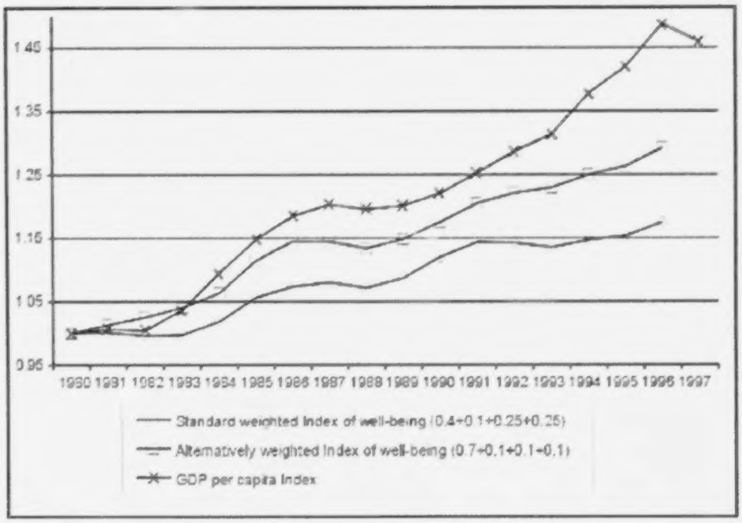


curity should show a deterioration.

Norway is a country where trends in economic well-being are, more or less, scaled-down versions of the trend in GDP per capita. In this case, our current estimates of trends in the Index of Economic Well-Being could be said to provide relatively little "value added," compared to trends in GDP per capita, since each index moves in much the same way over time (albeit showing much stronger growth in GDP per capita than in economic well-being).

Figure 4

Norway



However, Australia and Canada – whose economies share a relative dependence on raw materials production – are noteworthy in showing a greater cyclical sensitivity in GDP per capita than one finds in either measure of economic well-being, or in GDP per capita in other countries. In Australia and Canada, the recessions of both the early 1980s and early 1990s show up clearly in per capita GDP fluctuations – to a much greater degree than in Germany or Norway (the early 1980's recession is hard to find in UK or Swedish GDP per capita data). However, in both countries the trend in economic well-being indices is much smoother, because changes in current income can be much more rapid than changes in wealth stocks, income distribution and insecurity. Canadian trends in economic well-being are also quite similar for

Figure 5

Australia

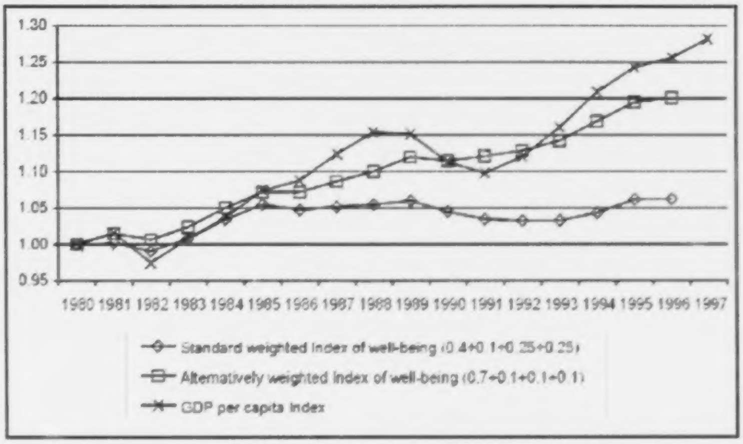


Figure 6

Canada

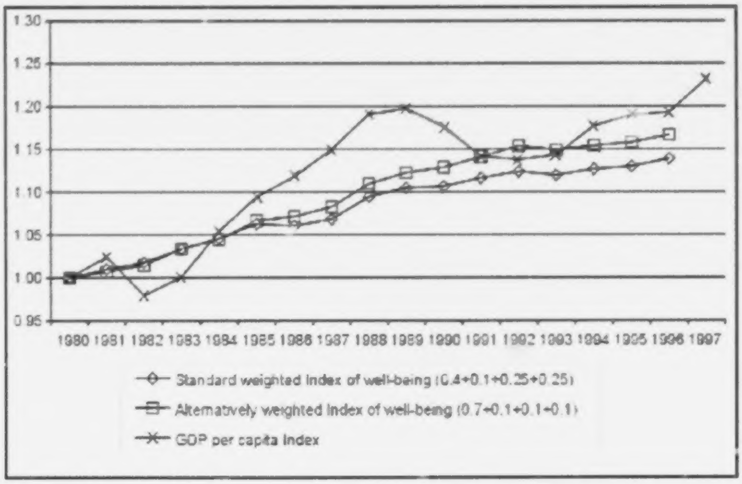
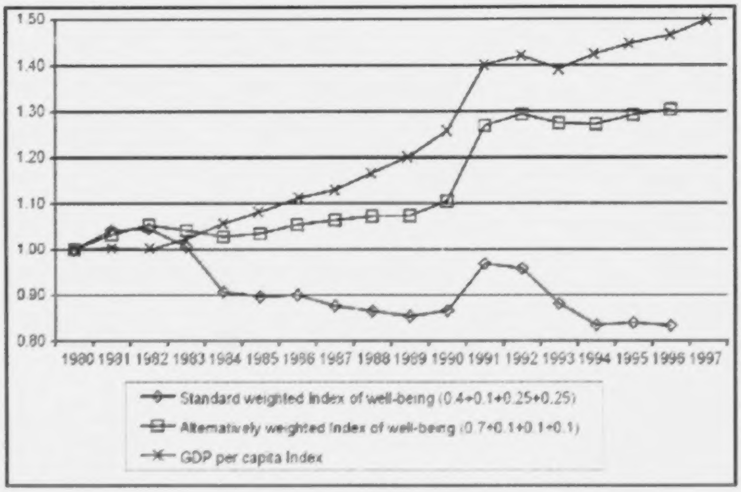


Figure 7

Germany



"standard" and "alternative" weightings of the index.[42]

4. Level Comparisons of Economic Well-Being

Comparisons of the level of well-being across countries are inherently much more problematic than comparisons of the trends in various components of economic well-being within countries. In cross-country comparisons, the institutional context of economic data differs to a far greater extent than in within-country, over-time comparisons. Calculations of purchasing power parity equivalence across several countries have greater uncertainty than comparisons of within-country consumer price levels. Statistical agencies in different countries differ in their data availability and data-gathering practices to a greater degree than they change those practices over time in the same country. For all these reasons, this paper avoids direct commentary on comparative levels of economic well-being.

5. Conclusion and Implications for Social Capital

> The regard to those general rules of conduct, is what is generally called a sense of duty, a principle of the greatest consequence in human life, and the only principle by which the bulk of mankind are capable of directing their actions.... Upon the tolerable observance of these duties depends the very existence of human society, which would crumble into nothing if mankind were not generally impressed with a reverence for these important rules of conduct.
>
> Adam Smith *Theory of Moral Sentiments*

Ch. V[43] (1986, pp. 110–112)

"Social capital" may be new jargon, but it is not really a new concept in social sciences. Among many other references, one can also note that De Tocqueville devoted Chapter VIII of his second volume to how "The Americans Combat Individualism by the Principle of Interest Rightly Understood." He claimed, for example, that "they show with complacency how an enlightened regard for themselves constantly prompts them to assist each other, and inclines them willingly to sacrifice a portion of their time and property to the welfare of the State" (1961, p. 146). Although not really new, "social capital" is, however, now enjoying a run in the sun of academic popularity – perhaps partly as a reaction to a period of recent excessive optimism as to what market individualism without any qualification of rightly understood self-interest will produce.

Earlier literature was not constrained by the conventions of GDP accounting, and could discuss directly the link between social capital and economic well-being. More recently, the measure of economic success has been narrower – and it falls to critics of the SNA to show that alternative measures are possible, plausible and make some difference. This paper has, therefore, developed an index of economic well-being based on four dimensions or components of economic well-being for selected OECD countries – consumption, accumulation, income distribution and economic security.

We argue that specifying explicit weights of these components of well-being is important in enabling other observers to assess whether, by their personal values of what is important in economic well-being, they would agree with this assessment of trends in the modern economy. Some events – like a major recession – may have adverse impacts on all four dimensions of well-being, producing lower average consumption, more inequality, more insecurity and less accumulation of capital for the benefit of future generations. In such a case, any differences in the values which determine the relative weights to be assigned to the components of well-being are of secondary concern. However, in other instances (such as environmental policy concerning global warming) the relative weights assigned to different dimensions of well-being may be crucial. A major reason for being explicit about the weights to be assigned to dimensions of well-being is to be clear about when there is, and when there is not, a conflict of values in the assessment of social trends – and when there is a disagreement about values, in a democracy a large part of the political process revolves around attempts to persuade others about which should take precedence.

In general, however, a key finding of this paper is that economic well-being, for at least two different sets of relative weights, has increased at a much slower rate over the last 25 years than real GDP per capita, a widely used indicator of economic well-being.

In Norway, trends in economic well-being are qualitatively, if not quantitatively, similar to trends in GDP per capita. However, in Australia and Canada trends in well-being are cyclically dissimilar to GDP per capita trends. In the US and the UK, the secular trend one perceives in economic well-being depends heavily on whether one uses GDP per capita or a broader index of economic well-being which includes consideration of income distribution and economic insecurity – and the same is even more true of Sweden. In some countries (e.g. Sweden), the trend one perceives in economic well-being is very sensitive to the relative weighting of consumption, accumulation, distribution and insecurity – but in others, this sensitivity is much less pronounced. In short, even with the highly imperfect data available for this study, there is a good deal more information content in using a broader measure of economic well-being than GDP per capita.

Why should someone concerned with social capital be concerned with the divergence between trends in economic well-being and trends in GDP?

Clearly, the issue depends partly on the definition of social capital being used, and there are several alternatives. As a consequence, it is perhaps most useful to discuss the links between specific aspects of social capital and the issues neglected in GDP accounting.

In section 2.1, flows of market consumption were adjusted for longevity of life, the amount of non-work time available and trends in household size. Each issue is highly relevant to the debate on social capital. We know from the work of Wilkinson (1996) and Lavis and Stoddart (forthcoming) that health outcomes are closely linked to the social support available to individuals. It is also clear that decreasing household size necessarily implies less shared contact within families and that the availability of time outside work[44] is a primal constraint on the formation of social links outside work and family.

This paper has not been able to include costs of "regrettable necessities" in its measure of personal consumption, although some such adjustments (e.g. the increased expenditures necessary to avoid the costs of crime) are clearly linked to social capital. Neither has it been possible to locate reliably comparable international data on the underground economy, although one could plausibly argue that it epitomizes the problem of decreasing voluntary compliance with the law.

With respect to the accumulation of productive resources from one generation to the next, if social capital produces economic well-being, changes in its stock should be directly counted in measures of accumulation. However, the formation of social capital is clearly not part of the GDP accounting, and it is not clear how it could be added. The measure of economic well-being proposed here does include a proposal to count the accumulated value of human capital stocks, and it is well known that measures of trust and participation in voluntary organizations are highly correlated with educational attainment. However, ideally one would want to measure both the accumulation of directly productive skills which individuals possess and the extent of changes in the quality of system-wide levels of social interaction (one aspect of social capital).

Measures of income distribution and economic insecurity are included in the proposed index of economic well-being because of their direct effect on the well-being of individuals. Whatever the level of per capita GDP, it clearly matters to individuals what their personal prospect of lifetime income may be, and how uncertain that prospect is.

This paper looks at actual income flows, after taxes and transfers. One possible manifestation of greater levels of trust in society might be electoral support for progressive income taxation, redistribution and the mechanisms of public social insurance. Alternatively, a possible consequence of increased voluntary activity might be the increased availability of private charity for the unfortunate. To the extent that more cohesive societies put in place mechanisms, whether public or private, for income redistribution and social insurance that mitigate the extent of inequality and economic insecurity, social capital matters for these dimensions of economic well-being in a way that is not captured by its impact on per capita GDP. Even if social capital, however defined, had zero impact on per capita GDP, and instead only served to decrease the extent of economic inequality, poverty and insecurity, it would be valuable for economic well-being.

In short, whatever the impacts of social capital on GDP per capita trends, social capital is likely to be even more crucial to a more adequate conceptualization of economic well-being.

Notes

[1] In order that this paper be self-contained and provide a full explanation of the methodology used to estimate the index of economic well-being, it draws on material from earlier papers which develop the index (Osberg 1985a; Osberg and Sharpe 1998, 1999).

[2] For real GDP per capita, see CANSIM D14606; for poll details, see Angus Reid Globe/CTV poll of July 1998, available at www.angusreid.com.

[3] Keunig (1998) reviews the contributions of Dawson (1996) and Kendrick (1996) and the most recent (U.N. 1993) revisions to the SNA.

[4] By specifying additive sub-indices, we are implicitly assuming that preferences for social outcomes are separable in their components (e.g. that the weight placed on consumption does not depend on the weight placed on inequality). We do not explicitly constrain the weights to be assigned to each component of well-being, since we think of them as the preferences of different observers. However, some observers may, if they are consistent, have linked preferences – for example, if attitudes to insecurity are driven solely by risk aversion (but see Osberg 1998b), then the weight an individual places on inequality, and the weight he or she places on insecurity, will both depend on the second derivative of his or her utility function.

[5] However, a sufficient (but not necessary) set of conditions for the index of economic well-being, we propose, would be that societal economic well-being can be represented

as the well-being of a "representative agent," assuming that (1) such an agent has a risk averse utility function (i.e. diminishing marginal utility); (2) from behind a "veil of ignorance" as to his or her own characteristics, each person draws an individual income stream (and prospects of future income) from the actual distribution of income streams; (3) each person has a utility function in which both personal consumption and bequest to future generations are valued; (4) individual income streams are exposed to unpredictable future shocks; (5) capital markets and public policies do not always automatically produce a socially optimal aggregate savings rate.

[6] A crucial data requirement for the index is comparable estimates of poverty rates and poverty gaps for all members of society, the elderly and single-parent families. Comparable estimates require comparable micro-data files and the only international source of such files is the Luxembourg Income Study (LIS). Because the number of years of micro-data tapes available for many of these countries is limited, only some countries (Canada, the United States, the United Kingdom, Australia, Norway and Sweden) have a large enough number of public-use micro-data files accessible from the LIS for construction of reliable long-run time series. Estimates of the index of economic well-being for Canada and the United States in this paper differ somewhat from our earlier estimates because the emphasis on international comparability of estimates has meant that some data originally used to construct the index for Canada and the United States, and not available for other countries, has not been used. Examples include estimates of the underground economy, commuting, human capital and natural resources. These omissions can affect perceived trends and the index of economic well-being presented in this paper is, in consequence, less sophisticated than our earlier estimates – an unfortunate tradeoff needed if more countries were to be included.

[7] The data for the six countries discussed in this paper and incomplete data for Germany, Belgium, Denmark, Finland, Italy, Netherlands, France and Spain are presented in tables available on the Web at www.csls.ca. In these tables, data are partly based on backward and forward extrapolation and interpolation techniques (extrapolated and interpolated estimates are given in italics). We hope that, over time, it will be possible to "fill in the blanks," and that more reliable estimates for more countries will become available.

[8] Since a great deal of work has been done on the valuation of household production, there is at least a clearly defined range of estimates. However, economists have paid very little attention to the measurement of insecurity (see Osberg 1998b), and the measures of economic insecurity are correspondingly underdeveloped.

[9] Consumption can also be calculated on a household basis. This estimate may be sensitive to the price series used to deflate nominal consumption. In the national accounts, the consumer expenditure deflator is used, which differs slightly from the Consumer Price Index. Any bias in price series would obviously bias estimates of average real consumption flows. The recent debate on CPI bias is thus directly relevant to the estimation of real consumption flows. The Boskin Commission (Boskin, Dulberger and Griliches 1999) estimated that the US CPI had an upward bias of 1.1 percent, largely due to the failure of prices indexes to capture the welfare effects of new goods and the quality improvements in existing products (Nordhaus 1997). In this paper, no adjustment is made for potential consumer price bias.

[10] Dan Usher (1980) of Queen's University has developed a methodology for the estimation of the value of increased longevity.

[11] Wolfson (1996) found for 1990–92 that the HALE for 15-year-olds was 7.8 years less than life expectancy (55.6 vs. 63.4 years). However, since there is no time series on HALE for Canada, we do not know if the rate of increase in the HALE has been greater or lower than life expectancy over time.

[12] Implicitly, this procedure ignores both the differential values which individuals might place on changes in mortality probability at different ages and the distribution, by age, of actual changes in mortality probability.

[13] Longer life and a more affluent retirement may interact in their impacts on well-being.

To some extent, we capture these interactions – in section 2.4.4, we note that economic insecurity depends partly on the level of poverty among the elderly, which has declined in most countries. However, no account is taken in this paper of any relative increase in well-being of the non-poor elderly.

[14] See, for example, Burkhauser, Smeeding and Merz (1996) or Phipps and Garner (1994).

[15] Even though the impact on average household size is the same, the impact on average living standards of (for example) a five-person household splitting will differ from the impact of a two-person household splitting, since the latter change will imply a greater loss of economies of scale.

[16] (To put this in more concrete terms, note that a difference of 564 hours per year is equivalent to an additional working day of 10.84 hours, every week of the year.)

Tables detailing the calculations of this section are available on the CSLS Web site. Tables 101-A to 112-A lay out the data for our estimation of the impact of working time on consumption flows, and hence economic well-being, for nine countries (Canada, Finland, France, Germany, Norway, Spain, Sweden, UK, and the US) over the 1980 to 1997 period. Table 101-A presents estimates of average annual hours worked per employed person from the International Labour Organization's KILM (Key Indicators of the Labour Market) database. Estimates for years where data are unavailable have been interpolated on the basis of a linear trend (and are italicized, for easy reference).

Table 106-A provides estimates of average after-tax hourly compensation in constant prices in NCUs and is calculated as the product of one minus the tax rate (Table 104-A) and hourly pre-tax compensation (Table 105-A).

[17] See Table 102-A.

[18] Table 105-A provides estimates of average hourly compensation per employed person in constant prices, expressed in terms of national currency. Use of NCUs of course means that the compensation levels cannot be compared across countries, although rates of change can be compared. Average compensation per hour is calculated by dividing total annual average compensation per employee (including in theory an imputation for the self-employed) by total annual average hours worked per employed person.

[19] See Table 108-A, Table 107-A, Table 106-A.

[20] Total annual hours of unemployment are calculated as the product of the number of unemployed and average annual hours per employed person on the assumption that an unemployed person wants to work average hours. Total unemployed hours are then divided by the working age population to determine average annual hours of unemployment per working age person.

[21] Statistics Canada has identified the following types of unpaid work: food and meal preparation; food or meal clean-up; cleaning; laundry and ironing; clothes repair and shoe care; home repair and maintenance; gardening and grounds maintenance; pet care; other domestic work, not elsewhere classified; physical care-children; education-children; medical care-children; other care-children; personal care-adults; medical care-adults; household management and administration; shopping for goods and services; transport-children; transport-all other household work; volunteer work; other help and care; and transport-other unpaid work. In 1992, household work represented 94 percent of total unpaid work, with volunteer work the remainder.

[22] There are a number of methodologies for the valuation of unpaid work, including opportunity cost before tax or after tax, or at the replacement cost using a specialist or generalist. The value of unpaid work is not surprisingly greatest when it is valued on the basis of opportunity cost before taxes, followed by replacement cost using a specialist, opportunity cost after tax, and finally replacement cost using a generalist. The rate of growth over time, however, is not greatly affected by which valuation method is used.

[23] If one could assume that income flows were always optimally divided between consumption and savings, one could omit separate consideration of consumption and wealth accumulation and concentrate on trends in average income. However, aggregate accumulation of private assets depends heavily on tax policy and accumulation of

public assets depends on spending decisions. Because both depend heavily on the political process, and because capital markets have significant imperfections, the assumption of automatic optimality seems too hopeful by far – for further discussion, see Osberg (1985a). Note that in aggregating over different forms of capital and environmental assets, we are implicitly following the "Hartwick Rule" for resource depletion, and assuming that accumulation and depletion of stocks of particular types of assets can be offset.

[24] See Coulombe (2000) who notes that the average depreciation rate for Canada's business sector capital stock over the 1961 to 1997 period was 10 percent compared to 4.4 percent in the US.

[25] The R&D investment series starts in 1960 so that the stock of R&D in 1960 is equal to the R&D investment that year and the series has a base of zero in 1959.

[26] The estimated market value is the price the resources would bring if sold on the open market. It is based on the difference between the annual cost of extraction of a given resource and the revenue generated from the sale of the resource. In other words, the total value or wealth associated with a stock is calculated as the present value of all future annual rent that the stock is expected to yield. The quality of the resources, the state of extraction technologies, the price of the resource and factor costs determine this amount of rent.

[27] Like these other assets, the value of the human capital of living persons represents the future consumption that possession of such assets enables. The endogenous growth perspective has argued that the benefits of societal learning are partly the output such learning enables in the current generation and partly the fact that future generations can start learning at a higher level. As a consequence, higher levels of education produce a higher long-run growth rate, as well as a higher current level of income (Galor and Zeira 1993, Eckstein and Zilcha 1994). If this is correct, a production cost valuation of human capital may underestimate considerably the value of the human capital stock investments.

[28] Implicit in this position is a belief that current stock market valuations (especially in the US) are excessive, and that the economy has not in fact entered a qualitatively new Internet era.

[29] Jenkins (1991) surveys the issues involved in measurement of inequality.

[30] Wilkinson (1996) argues that greater inequality increases the mortality rate. Daly and Duncan (1998) argue that absolute deprivation reduces life expectancy and conclude that policies targeted at increasing the incomes of the poor are likely to have a larger effect on mortality risk than policies designed to reduce inequality more generally.

[31] Since there is no data available on inequality and poverty within families, we have no option but to follow the standard pattern of assuming that equivalent income is equally shared among family members. Sharif and Phipps (1994) have demonstrated that if children do not in fact share equally in household resources, inequality within the family can make a very big difference to perceptions of the level of child poverty – and the same implications would hold for gender inequalities. However, since the issue for this paper is the **trend** of poverty, our conclusions will hold unless there has been a systematic trend over time in the degree of inequality within families (e.g. if senior citizen families, whose share of the poverty population has fallen over time, have systematically different levels of within-family inequality than younger families).

[32] In the period 1994 to 1997, poverty has risen in Canada and fallen in the US, for example. Canadian provinces are now indistinguishable from many US states – see Osberg (2000).

[33] To be precise, in the Econlit database from 1969 to December 1997, there are nine matches to the term "economic insecurity." A search of the Social Sciences Index from 1983, and the PAIS International and PAIS Periodicals/Publisher Index from 1972, yielded 11 matches. The Social Sciences Citation Index for the years 1987 to 1997 was sim-

ilarly unproductive.

[34] For example, a tenured professor with occasional consulting income may have a variable income stream, but feel little insecurity – and data only on individuals' income streams cannot reveal who had a long-term employment guarantee (like tenure), and who sweated out a series of short-term contract renewals.

[35] In the year 2001, the gender specificity of the language of 1948 will strike many people as odd – but Article 2 makes it clear that all Articles of the Universal Declaration of Human Rights are to be guaranteed to male and female persons equally.

[36] However, RATE = INCIDENCE x AVERAGE DURATION. Since the poverty rate among single parents is equal to the conditional probability that a single parent will enter poverty and the average duration of a poverty spell, we implicitly account jointly for the duration of poverty spells and for their likelihood.

[37] This procedure effectively ignores single male parents. While the authors of this paper feel this is an important group, males comprise only about 10 percent of the single-parent population, and their income loss on divorce is considerably less than that of women.

[38] In order that the base year for the indexes of all risks of economic security be the same at 1.000 in Table 9, the constant 2 has been added to the indexes of risk of illness, single parenthood and old age, whose original base was –1.

[39] A pure Rawlsian would put all the weight on the well-being of the least well-off.

[40] The weights are for 1997. The actual weights used vary by year.

[41] As well, we would caution that because we have not been able to get, for this paper, estimates of the income replacement provided under unemployment insurance in these countries, we may be overestimating the importance for economic insecurity of the rise in unemployment in these countries.

[42] But this paper does not capture the rise in economic insecurity produced by declining EI coverage.

[43] Thanks to my colleague Mel Cross for this citation, and others similar.

[44] In practice, the timing and predictability of work hours (e.g. shift work or mandatory overtime) may be just as important to the possibility of participation in voluntary activities, such as youth sports or choral groups, as the absolute amount of work hours.

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15

Social Capital and Social Learning in a Full World

Rod Dobell[1]

1. Preamble – Social Capital in Governance

This symposium poses the question "What are the contributions of human and social capital to sustained economic growth and well-being?" Inclusion of the word "sustained" forces consideration of possible ecological limits to human activity, and hence of the contributions of human and social capital to continuing well-being through the reconciliation of economic growth with such ecological limits.

The title for this session goes further, focussing on the role of social arrangements in promoting the sustained well-being of individuals, not just as economic agents but as citizens in a full world,[2] presumably through the reconciliation of continuing economic growth with both social obligations and ecological limits.[3]

The fact of a full world gives special weight to the role of social capital in governance, precisely because it forces appeal to explicit processes of deliberation and coordination, rather than reliance only on the unguided aggregation of uncoordinated individual decisions or actions, in containing the overall impacts of human activity. There are other social decisions where the necessity for deliberate coordination of human activities may appear to arise, but many of these are contested. In the case of human activities with serious impact on stocks of natural capital in complex and uncertain natural systems, the necessity is clear, and little questioned. In the full world, cooperation is essential; social capital, shared values and accepted ground rules are all important elements in building social arrangements which contribute to achieving such cooperation in pursuit of sustained well-being.

The significance of such questions can be illustrated by reference to a concrete local example.

As I left for this meeting, my email system was filling up with messages concerning the most recent crisis in the continuing "war in the woods" in British Columbia. Secret negotiations between forest companies and environmental groups about a possible logging moratorium on the central and north coast of the province were somehow disclosed to various media outlets and strongly condemned by unions, workers and leaders in coastal communities. But the motivation for such negotiations is clear.

> Canadian forest companies stand to lose $600 million in annual sales from Germany alone unless those operating on the B.C. Coast reach an accord with environmental groups, Germany's two major paper industry trade associations said Thursday... . The impact could be immense. In both the U.S. Pacific Northwest and Clayoquot Sound harvests were cut by 70 to 80 per cent to end environmental conflict. (*Vancouver Sun*, March 17, 2000)

> Weyerhauser vice-president Linda Coady, who is chairing a committee of the six companies meeting with the green groups, said the industry realizes the conflict must end... . Greenpeace market campaigner Catherine Stewart said the eco-groups' markets campaign was responsible for the change in attitude by the companies. Coady said other stakeholders – from the government to local communities – have not been involved because the companies view the conflict as between themselves and the environmentalists. 'We recognize that we can't make decisions about public land in British Columbia ... but we can ... see if there isn't some creative way we can solve these problems.' (*Vancouver Sun*, March 16, 2000; see also a follow-up editorial, June 6, 2000)

Similar examples abound. For a couple of years recently, an academic panel in British Columbia explored concepts of sustainable forestry and implications for economic analysis; the resulting collection of papers was published by UBC Press 18 months ago (Tollefson 1998) as one more academic contribution in a continuing stream of commentary emphasizing problems of governance in an industry in profound upheaval. For close to four years, a panel of experts established by the Royal Society of Canada's Global Change Program examined the impact of global change on ocean systems and marine fisheries. That report has just been published by the National Research Council Press (de Young, Peterman et al. 1999), again in the context of massive upheaval and crisis in the industry and on all three coasts of Canada as economic interests clash with ecological limits and proposals for community-based management multiply. Since about 1990, an extensive 10-country, multi-university research project has been exploring the evolution, over four decades, of social capacity, especially at an international level, for management of global atmospheric risks. The resulting two-volume book on social learning in several arenas was published by MIT Press early this year (Social Learning Group 2001).

The link from social arrangements to economic growth, and more fundamentally to sustained well-being of citizens, cannot be more starkly illustrated than in any of these examples representative of dramatic institutional change everywhere.[4]

The reconciliation of all the conflicting interests and perspectives involved, or more generally the role of social capital in deliberative processes aimed at the resolution of such dilemmas, is a central issue in this review.[5]

Thus, sustained economic growth (and well-being in general) now depends crucially on social capacity to arrive in some reasonably timely way at reconciliation of many conflicting readings of the state (and nature) of our social (and natural) world system, and at consensus on collective action required to respond to the changing state of that system (usually through measures, collectively agreed upon, to influence or shape the behaviour of individual actors – people or agencies).

Such reconciliation depends pivotally on individual attitudes, values and beliefs, and on social arrangements and social processes such as deliberation and dispute resolution to bring coherence to those arrays of individual positions. It also depends on the presence of a whole range of individual and social resources which are in the nature of stocks or assets (capital) that can be built up, nurtured, drawn down or destroyed in various ways over various time scales (Dobell 1995).

2. Introduction and Outline

In this paper, I try to suggest a few key elements of a research program for the OECD to consider in studying the role of social arrangements in promoting the sustained well-being of individuals and communities, and offer a few pointers to literatures (on the fringe, or outside the usual bounds, of economics) which might contribute to such an examination. The discussion is speculative, in no way pretending to be definitive either empirically or analytically. It does, however, focus on links involving social arrangements and human well-being, suggesting some hypotheses that might lead to fruitful explorations, either analytical or empirical. As implied by the title, the paper seeks to underline the importance of the "full world" setting, with its need to take into account many forms of capital, many forms of social resources, and the importance of social learning as one route to nurturing and conserving social as well as natural capital.

Such a research program must be, first, comprehensively interdisciplinary. It must also be intrinsically a systems model, with explicit consideration of the key systems and complex dynamics of a full world. In that setting, complex human and social systems whose laws of motion we can hope to establish – or at least influence – for our own purposes must be seen as sub-systems of overall natural dynamical systems evolving according to laws of motion over which we as humans have no control, or, at best, only very limited, often ill-understood, influence.[6]

Social arrangements may be studied in terms of either structure or process. Section 4 outlines a sketch of **structures** in which questions about social capital arise, and section 5 provides a sketch of social **processes** in which related questions about social capital also arise, although differently.

All these questions are posed against a backdrop of individual beliefs and values taken as given, shared to differing degrees by individuals in different communities. But a central question in thinking about social capital is precisely how processes of social learning shape both beliefs about the world and values guiding action in it, and drive convergence toward common sets of shared beliefs, again to differing degrees in different communities. The body of this paper closes with brief reference (in section 6) to this feature of social capital: how it might emerge from evolving experience with deliberation and shared decision making in formal systems of governance as well as less formal civic associations.

The story here is complex, trying to weave together a large number of distinct strands. Let me try to outline the central thread. In section 3, the case is made that the pursuit of well-being for the citizen demands attention not just to economic systems and economic resources or capital, and social systems and social capital, but also ecological systems and natural capital. The suggestion is made that ecological sustainability, along with social justice and economic prosperity, is a necessary condition for the well-being of citizens. All are essential to sustained well-being; the role of social arrangements in promoting well-being must be examined in that light.

In section 4, the key point is the emergence of a vast array of organizational arrangements and agencies, established for instrumental purposes, to serve the interests of people interacting in the context of a more personal civil society. It seems fruitful to identify the distinction between the former cluster of social contrivances constructed for instrumental purposes and the latter concept of civil society as the space outside such formal structures with the distinction proposed by Habermas (1984) between System and Lifeworld.[7] But in any case, the point is that the governance processes pursued in the former structures are quite different from the activities of individuals in their daily roles. In the former roles, people act officially, as agents, with positional responsibility. In the latter, they act individually, as principals, with personal responsibility. The bodies of experience built up; the manner in which that content is shared; and the expectations and norms of conduct (i.e. the accumulated stocks of social capital) might all be expected to be quite different in the two settings.

Section 5 offers a different perspective on the same idea. It suggests that it is necessary to distinguish citizen involvement in the abstract processes of System from citizen engagement and commitment in the concrete processes of collective decision and community-based risk management in Lifeworld. It suggests that successful experience in Lifeworld builds bonding social capital, while successful experience in System builds bridging social capital. Addressing the dilemmas of ensuring faithful interpretation and realization of intentions in System through action in Lifeworld – pursuing subsidiarity down through all the cascades of responsibility in systems of tiered governance – entails what Woolcock elsewhere in this volume suggests we might call linking social capital. Empirical work might find hypotheses to discriminate among these different functions.

Section 6 suggests that it would be fruitful also to distinguish the building of social capital and confidence in institutions through experience with the dynamics of decision and capacity building in System from the emergence of cooperation and confidence in indirect reciprocity through repeated interaction in Lifeworld. Thus, as we think about governance and the pursuit of sustained well-being for citizens, we are led to ask whether the experience of reciprocity in neighbourhoods or nations can somehow be transferred to citizen confidence in their control of processes and decisions in abstract virtual communities and global System (embracing both global economy and global state as well as global non-state, non-corporate organizations).

Section 7 tries to draw together some conclusions for elements of a research program.

For present purposes, then, it is important to distinguish many different components of social resources:

- financial and physical capital (hardware)
- tradeable intellectual capital (information and explicit knowledge – software – intellectual property)
- human skills, tacit knowledge or wisdom (wetware), which are inherently embodied in a single person (which we might therefore call human capital)
- natural capital, a highly complex set of resources whose valuations must reflect the overall functioning of ecosystems
- social, cultural or institutional capital, here taken (following Putnam, Woolcock and others) to be not embodied in individuals but a property of relationships among individuals, agents and groups – a network property reflecting shared values, a convergence of beliefs and a degree of mutual confidence in generalized reciprocity that facilitates collective action.

The key point in this setting is that the social resource we wish to define as social capital should be considered an emergent property of the system as a whole. For purposes of this paper, at least, social capital is thus clearly distinguished from human capital. Individual investment decisions govern the accumulation of human capital, whether this shows up as skills in the formal economy, commanding tangible monetary rewards, or individual skills in participation in networks and social structures, commanding tangible or intangible returns in terms of financial reward, political influence, social success or mating opportunities. (This idea that learning, over a lifetime, in formal and informal institutions, to be a citizen and a participant in the community as well as a worker or participant in the formal economy has both private and social payoff is, of course, not new.[8])

Thus, the issue of human capital is not only a matter of investment in occupational or professional skills and productive capacity; it is also investment in understanding and social skills – individual capacity to participate in ongoing social processes and cultural practices, perhaps particularly around reconciliation of risk perceptions. There is a substantial ongoing research agenda to be pursued in connection with this topic in itself, as the paper by Ed Glaeser in this volume makes clear (see also Tansey and O'Riordan 1999). The issue of social capital is distinct from even this social aspect of human capital, however, and relates to the features of a society which make it possible to arrive at collective decisions which will stick, which will be implemented, and which will command continuing allegiance and hence see continuing compliance.

The emergent character of social capital rests substantially on the importance of shared values, shared understanding, shared language, coherence of beliefs across individuals. Anthropologist Edward T. Hall has referred to "high context" and "low context" societies or groups (Hall 1976). Convergence through learning processes and social interaction to a "high context" institutional setting economizes on transactions costs, supports faster and more effective dispute resolution, and leads to greater support for community decisions. (Whether these are good or right or morally justifiable decisions is a different question.)

Thus, it is the formation of human capacity and cultural understanding, on the one hand, and social capacity to facilitate constructive interactions among individuals and to support continuing deliberation in a democratic and inclusive manner, on the other, that will prove essential to both continuing economic growth and ecological sustainability. The role played by informal continuing education and formal public education as part of social support for deliberative and inclusive social decision processes will be key in itself. The hypothesis is that differences in social and economic performance across countries will increasingly reflect differences in community capacities to arrive at timely decisions amicably, effectively and equitably, and to implement decisions speedily, with reciprocity, trust and confidence. Respect for a broadly interpreted "rule of law" extending well beyond protection of formal property rights to embrace a full set of assurances as to voice and opportunity in social as well as economic systems will probably prove essential here. As we study the role and significance of social capital, we need to look more closely at these social structures and decision processes.[9]

This orientation entails emphasis on governance broadly interpreted, not on the quality of government services or the security of property rights. Indeed, to the extent that social capital facilitates effective social discourse in a changing world, it may be directed toward abridging and constraining the exercise of individual property rights. In a world of inevitably and profoundly uncertain natural systems, there cannot be certainty of tenure or secure property rights as conventionally understood – there can only be secure rights to participate in legitimate social discourse and deliberation around such rights. Thus, as noted above, we probably need to rethink what we should mean by "the rule of law" in a complex and changing world where many forms of capital matter are involved in shaping the future.

It is perhaps worth emphasizing explicitly that such decisions are inherently group decisions, not individual choices about participation, investment or other conduct. There are, of course, many theoretical and empirical challenges around such individual choice questions, but the focus here is on the inherently collective features of group decisions about measures or instruments to influence or regulate those individual decisions, and the extent to which there is a shared body of core values and common understandings to set the social context within which individual decisions are shaped and taken.

3. A Full World

The underlying preoccupation in the full world as described in note 2 can be formulated as concern with the continued integrity and health of the ecosystems which make up the biosphere, or in other words with stocks of natural capital. Much current debate can be seen as contesting whether the formal institutional mechanisms of the economy are appropriate for managing human activities with significant cumulative ecosystem impacts, or whether other social arrangements are essential. This paper reflects the view that a paramount feature of social capital, perhaps different from its manifestation in dense networks of civic association, is its link to accepted social processes for governing human activities within the limits of natural systems.

Thus, we are concerned here with social capital in governance broadly conceived. This interest entails seeking more general measures of government performance than the economic statistics that have usually been emphasized, but more fundamentally it leads to a concern with community success in managing dispute resolution, the reconciliation of conflicting perspectives both on the challenges facing communities and on appropriate collective responses to them. The need is for continued individual action that leads toward realizing collective intentions in an uncertain and changing world; in particular, a key concern is with social capacity in managing the essential but wrenching transition to sustainability in human activity.

The particular lessons which the full world context dictates for study of social capital, then, are:

- Stocks of natural capital, webs of ecosystem structure and flows of ecological services are crucial in supporting human life and individual well-being. In general, these stocks, webs and services are unpriced and unrecorded in any conventional measures of economic growth; other social arrangements for monitoring and decision making are essential.
- The ecosystem structures that include natural capital and ecological services are complex, changing, uncertain and vulnerable. These features have to be reflected in social decisions attempting to contain the impacts of human activity within the limits of ecosystem capacity to absorb them, not just in aggregate but in activities at local or community levels.
- There is a special role for social capital, in the sense employed in this paper, in managing access to natural capital and shared ecosystems and in containing the extent of human impacts. Indeed, it is precisely this role which is the focus for much of the best-known empirical work on the formation of social capital and the role of institutions (Ostrom, Gardner and Walker 1994; McGinnis 1999).
- There are many forms of scarce and valuable social resources, and these are "owned" in many different ways; access, use, management or property rights relating to these resources are all important elements of social arrangements.
- In particular, there will be special burden on social arrangements which support the continuing adjustment of such rights of access in light of emerging new knowledge about ecosystem states and risks (Bromley 1991; Hanna, Folke and Mäler 1996).
- Social capital, in the sense above, relates to inherently group decisions, to the norms and shared understandings which set a social and economic context for individual optimizing decisions driven by self-interest as interpreted by the individual.

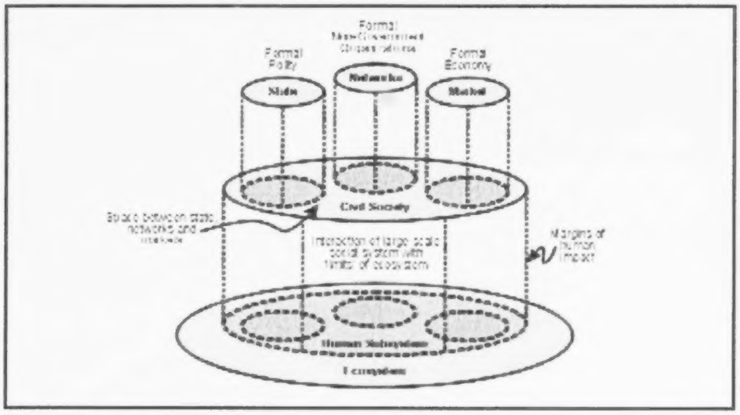
4. The Structure of Social Arrangements – Emergence of System

Structures of Governance

Social capacity demands instruments beyond the informal relationships of civil society. Figure 1 expresses the notion that formal organizations are created for instrumental purposes, in the service of people and civil society. The diagram also suggests that it may be fruitful to distinguish institutions as norms, conventions or rules in use from the organizational shells in which they might be embedded. There is a need to distinguish the people from the structures, the personal Lifeworld from the formal System (Habermas 1984). In particular, it is important for us to separate the organizational reality from the romantic conceptions. Government agencies are not "democracy"; transnational corporations are not Smithian economic agents and the integrated global economy does not constitute a Smithian "market" with any optimality properties of the original Lifeworld counterparts. Similar concerns are arising with the large non-government organizations sometimes confused with the concept of networks which has emerged to complete the triad of major communications structures or organizational modes (Ronfeld and Thorup 1994).

Figure 1

Systems context and institutional structures


Formal
Non-Governmental
Organizations
Formal
Polity
Formal
Economy
State
Networks
Market
Civil Society
Space between state, networks and markets
Interaction of large scale social system with limits of ecosystem
Margins of human impact
Human Subsystems
Ecosystem

These formal institutional mechanisms that were intended to serve an instrumental purpose can subsequently, in many different ways, assume a life of their own. Problems of agency arise everywhere (Dobell, Slaco and Longo 1999). (The "intrusion of System" refers to widespread loss of a sense of agency with respect to these instruments. Between individual intentions and individual action intervenes a whole apparatus of organizations in which people act officially, as agents, not personally, as principals, and these organizations increasingly seem to be beyond reach.) One key feature of social capital in this formal organizational setting might then be its contribution to restoring to the citizen the sense of agency lost in relation to these formal structures and the processes (globalization, technological change,...)

that are driven by the decisions made in these formal structures.

There is an important question here, dealing with parallel concerns about mechanisms of governance in each of these organizational or institutional settings (Williamson 1996). Research might fruitfully draw on the parallels in current discussion of problems of legitimacy, accountability and transparency in respect of government and quasi-government institutions, in respect of non-government institutions, and in respect of corporate governance.[10] With respect to the first, there is a tradition going back many years to Weber (1968) in recognizing the possible difficulties for citizens or their representatives to maintain control over their agents in the bureaucracy. With respect to the last, there is also a long tradition, going back at least to Berle and Means (1932), in worrying about the loss of control by owners to managers.[11] Concerns about the legitimacy of non-government networks or civil society organizations are more recent, but growing. See, for example, the questions raised about the "democratic deficit" by Smith and Naim in their popular booklet *Altered States* (2000, p. 63) or, in the special case of cyberspace, Fishkin (1999).

The point here is that we must distinguish between the formal organizations and their functioning on the one hand, and the norms and conventions that they are intended to represent, on the other. In contemporary discussions of governance, much reference is made to shifting modes of consultation, to involvement of stakeholders and non-government organizations in the decision processes of governments, corporations and intergovernmental organizations. These are important developments; in particular, establishing through governments the essential social frame around corporate conduct and commercial (trade) relationships is absolutely vital. But none of this is the same as effective involvement of civil society. Like "sustainable development," the expression "civil society organization" should perhaps be treated as a creatively ambiguous oxymoron. The formal non-government organizations, associations and networks that are the subject of so much current discussion are not fruitfully, in my view, to be considered part of civil society. They may remain closer to the instrumental roles for which they were designed; they may offer their principals a greater sense of involvement and agency than do either governments or corporations, but they are still formal institutions. Whether they constitute a proper link in the social coordination of individual activity on the ground or at sea depends on whether they are functioning properly as instruments for civil society.

Thus, to sum up this introductory scan, it can be argued that social decision processes face blockage or breakdown in formulating necessary responses to external shocks or internal change. With respect to the traditional institutions of the state, or formal polity, there is a loss of confidence and trust. Representative democracy seems to be in crisis as the scale of governance challenges increases. Neither direct democracy nor deliberative democracy seems to offer a ready replacement; whether the information revolution will promote one or the other seems unclear. The role of social capital in facilitating such decisions is a key part of its contribution to the following questions:

- How might one distinguish operationally the rules, norms, values and other aspects of organizational culture from the shells in which they operate (Vincent Ostrom 1999)?
- How to make fruitful use of the distinction between civil society as Lifeworld and formal System as the sphere of action for agents, not citizens as ultimate principals?
- How to define the problems of agency which emerge and relate these to governance mechanisms within each category of organization?
- How to address and mitigate the measurement dysfunction problems that arise when public debate centres on the formal economic component of the system, particularly when its modes of operation are viewed as beyond control by civil society (or at least the technical issues of architecture and regulation displace the concern for values-based control by citizens)?
- How to distinguish fruitfully the personal relationships of civil society from the formal "civil society organizations" (CSOs) which are simply another form of social arrangement or institution created to serve human purposes as the prior forms (state and corporation) seem to slip out of control?
- How to track effectively the changing allocations of responsibilities among agencies and between Lifeworld and System?

Global Citizenship and National Difference

Tiered governance and subsidiarity complicate this common problem of linking global norms to local action. As deliberative processes recognize the importance of spillovers and interdependence, there is a tendency to escalate the scale (and the level of abstraction) at which issues are addressed. Membership in various groups, from kinship groups through neighbourhoods to nations and international coalitions, conditions entitlements to various bundles of rights. Claims of eligibility for membership thus become contested.[12] As we move from kinship claims toward group selection or nationhood claims and beyond, we move away from bonding social capital toward more general forms of interaction and recognition in a global or virtual setting. Conversely, as we move down toward more tightly defined groups, direct interactions, recognition and reciprocity grow; acceptance of mutual claims and mutual obligation increases. The dark side of social capital shows itself: membership implies exclusion just as surely as it implies inclusion. Study of social capital should address directly these questions that arise as global cosmopolitanism contends with national differences. Can an appropriate radius of trust or radius of concern vary with the nature of the need expressed? Can there be reconciliation of universal values with distinctive community bonds? In the structures described in the previous section, civil society is the home of "nations"; formal System is home for states, including the global state, and for the global economy, and, increasingly, for civil society organizations. So it is necessary to look at different forms and functions of social capital in different components of the structures above.

Basic citizenship at the global level then might include core claims to assured fundamental human rights, fundamental democracy and fundamental economic freedoms (including perhaps individual entitlements to an equitable share of the returns to the increasingly scarce and valuable resources of the global commons, the common heritage of humankind). As one moves toward groups more tightly knit, with greater intensity of social networks of interaction, reflecting greater stocks of bonding social capital, there is greater acceptance of mutual claims and mutual obligations, as noted above, with corresponding exclusion of others outside the bounds of the group as it defines and perceives itself. So long, however, as these claims represent simply additional claims within the more tightly defined group, without compromising or jeopardizing the basic body of claims accepted within the less tightly defined group, there is perhaps no injustice, no downside to the increase of bonding social capital.[13]

There are many expressions of this idea of the essential distinction between the individualized, abstract, global system and the more bonded personal system. Dahrendorf emphasizes it on many occasions, for example:

> In one sense, democracy and the market economy are desirable precisely because they are cold projects which do not make any claims on the souls of men and women. But I appreciate, increasingly, perhaps, that so far as human society is concerned, this is not enough. We need conflict, we need change, but we are threatened with anomy. This threat cannot be averted by normal politics. People need ligatures as well as options to enjoy full life chances, and ligatures require the variety of autonomous associations that we call civil society. (Dahrendorf 1997, p. 48)

Charles Taylor has addressed the issue in many ways, asking, for example, "Why do Nations Have to Become States?" (Taylor 1979). Will Kymlicka's current work emphasizes the compatibility of what he calls Enlightenment cosmopolitanism – the global order in which individuals are organized for maximum freedom as citizens of the world, bearing common basic rights – with culturally based nationalism under which a richer, but not necessarily incompatible, body of rights may be claimed (Kymlicka 2000).

In the early-to-mid 1970s period that gave rise to concerns about excesses of democracy and problems of ungovernability, as Berman reminds us, there was discussion of this same worry about the disjunction between an abstract and impersonal global view (what Berman calls biosphere politics) and a grounded, rooted neighbourhood view that Berman calls ecosystem politics (Berman 1984).[14]

5. The Policy Cycle as a Reflection of Social Arrangements

From the point of view of process, rather than structure, somewhat the same distinctions as in the previous section emerge. Figure 2 displays, without implying anything about observable stages or actual sequencing of events in a real world, the components of the standard policy cycle, conventionally understood. Again the intrusion of System is illustrated: only in the small portion of the diagram around 6 o'clock are we representing individual action and personal engagement; all the rest of the action is in one way or another in agencies, within formal organizations operating on the basis of authority. This more-or-less standard view of the policy cycle (as a conceptual framework through which to organize the literature, if not as a chronologically reliable model of the policy process itself) is here called the commitment-compliance cycle to emphasize the role of ideas as opposed to bureaucratic mechanism.

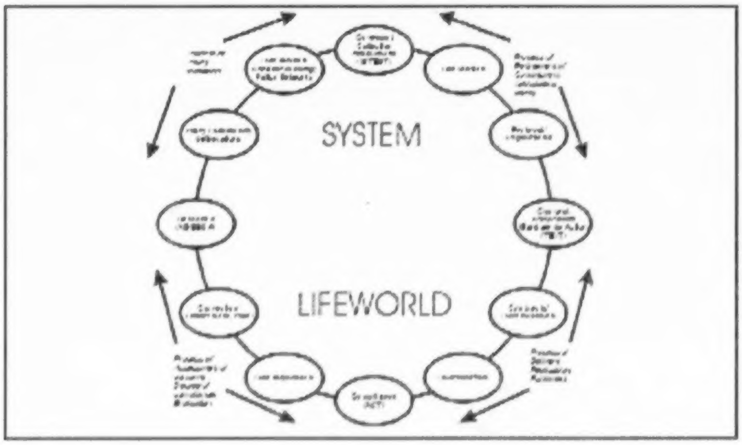
For expository purposes, four main phases in the cycle can be distinguished:

- Awareness and assessment of the state of the world and the consequences of action in it, leading to identification of an agenda for further action (the stage of evaluation and agenda formation, from 6 o'clock to 9). It is important to emphasize here the vast extent of current work on measures that might serve as a better basis than we presently have for assessing and reporting on well-being and progress toward sustainability, taking into account the much enlarged array of stocks and services to be considered in the full world (see Prescott-Allen (2000) or the extensive links listed by the International Institute for Sustainable Development (2000) as well as the references cited by Osberg and Sharpe in their paper in this volume.) An implication from this work is that it is not as important to have more precise measures of the impact of policy or investment on a subsidiary indicator like economic growth as it is to have some measure of impact on fundamental indicators of well-being, whether or not any single aggregate ("heroic") indicator can serve adequately for this purpose.

- Development of consensus and formation of intent to respond to perceived problems through agreed action (the policy formation process, the traditional concern of policy analysis, from 9 to 12).
- Following the development of consensus on intent, or the declaration of intent, or the formation of a covenant to act, the process of refinement of intent into concrete operational mandates for organizational and ultimately individual action (the formal implementation phase, from 12 to 3).
- Realization of intent through individual action in compliance with mandates (the delivery phase, from 3 to 6).

Figure 2

Commitment-compliance cycle



Again it is clear, as in the previous discussion of structure, that representative involvement in the formal processes and institutions of governance should be distinguished from individual engagement in action that complies with mandates and realizes the collective intent.[15]

The "cooperator's dilemma" is one version of the problem of achieving a cooperative optimum in the face of conflicting short-term individual incentives. A substantial literature explores this dilemma (see, for example, Lichbach 1996); resolution seems to rely upon notions of trust and reciprocity rather than formal structural innovations. The role of "linking" social capital may be central here, as one moves from abstract higher level argument and agreement to more local action.[16]

With a focus on individual interpretation of the degree of compliance and the corresponding action necessary to realize collective intent (the "performer's dilemma"), there may be more emphasis on the more subjective aspects of interpretation of, and fidelity to, the text than on the more objective and structural issues of economic incentives, rewards or claims. This distinction between the subjective and objective issues in implementation and realization may be closely related to alternative cultural approaches to concepts of rationality. A recent speech by Deputy Secretary-General Seiichi Kondo of OECD picks up this question of discretion in interpretation (Kondo 2000).

But the intrusion of System, and the felt loss of human agency with respect to instrumental organizations and structures, make it difficult to achieve any recognized legitimacy for such variations or discretion in interpretation. Problems in achieving effective subsidiarity are inevitable. While it is clear that the abstract systems of individualized global civilization do not in themselves meet aspirations for well-being, for present purposes it is even more crucial that they are inadequate to deal with these problems of subsidiarity and implementation in the face of continuing uncertainty. One cannot draft clear and unambiguous rules or policies that will cover the full range of circumstances encountered in a changing world, as both Ashby's Law of Requisite Variety (Ashby 1952) and work on street-level bureaucrats (Lipsky 1971) or bureaucratic justice (Mashaw 1983) make clear. One has to rely on context and social capital.

The role of social capital and community norms in achieving loyalty to the intent, when fidelity to the text cannot be maintained, raises questions of incentive structures. Recognizing that all use of governing instruments may be viewed simply as alternative means to signal to individuals the social consequences of their individual actions, one is led to consider other means to communicate these consequences, and to ask whether ultimately "getting the incentives right" becomes redundant because the spillover consequences have been fully internalized in individual belief systems, so that "the motivations are properly aligned."

That is, everything from noon to 6 o'clock on the Commitment-Compliance Clock in Figure 2 is an attempt one way or the other to achieve the realization of policy intentions by shaping the discretionary actions of the individual. It is interesting how many ways this question of discretion and responsibility in the interpretation of texts arises. The choice of governing instruments can be interpreted as selection of alternative ways to communicate to individuals the social significance of consequences arising from their actions. Prices, taxes and subsidies signal directly the costs or returns that actions may bring. Regulations signal probabilistic costs, with the expected values dependent on the outcomes in a long chain of contingent events from detection of non-compliance through to prosecution and penalty.

Suasion, challenges and other campaigns for voluntary action all try to lead where sticks might not. But all such instruments work against a backdrop of norms and expectations built up from history and experience, and are not easily changed.

So while the "cooperator's dilemma" involves legitimacy; the "performer's dilemma" perhaps involves authenticity. In the more abstract setting, social capital entails confidence in institutions, built up through successful record in epistemic communities. Issues of shared language and bridging social capital dominate. At a personal level, in civil society, the concern is more with personal trust or bonding capital. But one may note the interesting feature that even at the more abstract level, issues of bonding social capital may arise – the appearance of increasing effectiveness in epistemic communities as experience accumulates may be one example. And communities of interest may also operate in formal economies, even as virtual communities or communities of interest, with bridging but not bonding. Edward T. Hall's work on "high context" communities (1976) is again relevant here.

Thus, another research question arises in assessing the role of social capital in governance. It may be easier to exploit creative ambiguity to achieve agreement by escalating conflicts to more abstract levels as argued above, but there one may have formal representation of parties emphasizing formal, short-term, conflicting interests, and only bridging social capital as a resource. On the other hand, though the concrete costs and risks of implementation may be more clearly seen by citizens directly engaged at the local level, there may also be a greater stock of bonding social capital to fall back on. It may be easier to see shared interests, relying on friendships and loyalties to overcome the recognized immediate costs and promote greater cooperation and greater engagement in service of a longer term vision. Where, in the end, is one likely to find the clearer sense of long-term enlightened self-interest?

6. Social Learning – Changing Beliefs and Changing Context

> Human intentionality is not optimally productive and effective until it has been acculturated through a long educational process, by which the capacity emerges for cooperative social action based on a high degree of shared perception and understanding, or knowledge. (Freeman 1999, p. 163)

We also need attention to the public space where ideas and beliefs themselves are disputed and evolve. It is important that we look to processes of reshaping the ideas and values which flow into forming collective intentions.

The previous two sections have examined structures and processes that establish a social context for individual actions and individual decisions (including decisions about the formation of human or other forms of capital to improve participation in ongoing social processes). They assumed that individual action is shaped by bringing together individual beliefs about the nature of the world and how it works with individual norms to guide action and conduct within that world. One approach to assessing the stock of social capital might be to examine the extent to which such beliefs and norms are shared, held in common by individuals.

The context within which individual decisions are made can thus change in two ways: 1) as the proportions of individuals holding particular beliefs or norms vary within a particular population, the degree of sharing or consensus around particular values varies; and 2) as the particular values and beliefs of the individuals in that population themselves change.

So we may ask how social capital in a particular community may change through either of these mechanisms. On this question, the remarkable review of the concept of social learning prepared by Ted Parson and Bill Clark for the Social Learning Project (Parson and Clark 1995)[17] offers a good starting point.

That project (Social Learning Group 2001) documents specific cases illustrating processes by which evolving knowledge has moved into collective action to respond to changing perceptions of global atmospheric risks. Social learning reflects learning by doing through experience in successful group processes, inter-subjective communicative action (Habermas 1984).

A widening body of work on experimental economics (a recent article, Wedekind and Milinski (2000), cites a number of references), set in the growing understanding of the dynamics of complex systems, illustrates both the extent of differences in norms of conduct, and the dynamics of processes by which groups holding such norms or beliefs may "colonize" populations initially guided by shared allegiance to different norms or beliefs.[18]

This work on cellular automata seems to link interestingly with recent work portraying individual understandings of the world as captured in chaotic attractors in neural networks (Freeman 1999), and shared such understandings as memes (Aunger 1999). We then see the possibility of extending not only our process diagram to include the dynamics of evolving ideas driving changes in the formation of collective intention, but our structural or institutional diagram to include a universe of individual ideas, shared ideas (memes) and cultural evolution along with the natural world of genes and biological evolution. The link between the development of social capital and the effectiveness of the institutions by which we attempt to exercise agency then becomes an obvious topic for research. We need to explore the way in which all of these institutional arrangements or social contrivances mediate between our beliefs and our actions in the world.

A particular question to explore is the shifting balance between belief in immediate exchange, direct reciprocity and legal contract on the one hand, and confidence in deferred return, generalized reciprocity and social contract, on the other, as the appropriate vehicle in the pursuit of enlightened self-interest. Reliance on the former leads to concern with explicit incentives and immediate rewards; reliance on the latter leads to less tangible motivations and confidence in the promise of returns through improved social functioning and future recognition of claims on a sustainable society.

Particular interest attaches to short-term versus long-term interpretations, with much of the interest in "taking the altruism out of altruism," recognizing that trust may be merely an informed calculation of self-interest based on confidence, formed by experience, in generalized reciprocity.

Educational activity, the promotion of public understanding, thus has two goals. First is a sharpened visioning and signalling of the likely longer term consequences of individual action in its collective context. Second is the development of an individual moral code which can serve to guide individual interpretation of collective intent as set out in the various texts and formal mandates emerging from global processes of policy formation. That is, individual beliefs, taking into account the anticipated responses of others, about the long-term consequences of adopting particular codes of conduct may be influenced both by experience and by conscious deliberation, with or without analytical support.

On this matter of social learning, I cannot resist reference to the problems of subsidiarity again, but in a substantially more speculative fashion. In his review of Susan Blackmore's book, *The Meme Machine* (Blackmore 1999), Robert Aunger of King's College Cambridge refers to the central role of neuronal networks and suggests:

> In effect, the physical network of neurons is trained by the environment rather than predetermined by genetic instruction [coding] … . [T]he larger the brain becomes, the more room there is for a second source of control of information processing, and hence of behaviour. As a matter of fact, it is not even in the interest of genes to control neuronal activity at such small spatial or temporal scales. If they did, learning would be ruled out, and so would the particular genius of the brain: its ability to respond more quickly to environmental changes than genetic mutation would permit. Thus, by handing over control of learning to neuronal networks, genes may have created the opportunity for a competitor to evolve … . But the gene-

> meme conflict would also leave room for adaptive, independent decision making – human agency. That message should comfort just about everyone. (Aunger 1999, pp. 39, 40, 42)

It is standard imagery in economics and in the literature on spontaneously emerging or self-governing organizations to visualize "institutions" as mediating between individual preferences (exogenously determined) and the naturally determined dynamics of resource systems. In the present discussion, we see the possibilities for social learning to drive cultural evolution and reshape ideas (in the world of memes), which are then linked through complex processes to individual action (in the world of genes). Aunger's notions of the tension between the purposes of genes and those of the memes created as agents to manage the finer grained adaptations to a changing environment bring us back in intriguing ways to the questions of agency, and agency gone wrong, which have recurred throughout this note. Even more suggestively, perhaps, we might view Figure 1 as having added, through cultural evolution, a top layer, a world of memes. These we humans, as part of a complex social (including economic) system, have coded into much firmer structures, the organizations which we have called System, or bitsphere, intended as an instrumental institutional framework to facilitate interaction within the biosphere, and to mediate between ideas and action in the natural system, the world of genes. Instead of institutions to mediate effectively between our ideas (a generalization of the economist's exogenous preferences) and our actions in the biosphere (which determines potential, or production possibilities, and the evolution of the system), things have gone wrong: we have civil society condemned to shape action in Lifeworld to satisfy the demands of System. People are called upon to bear the costs of action in the biosphere to serve the imperatives of what should be their intermediaries or agents in the bitsphere.

So the basic challenge to be met through the formation of social capital and pursuit of social learning is to communicate consequences sufficiently clearly to engage enlightened self-interest, and to change beliefs, views and paradigms to arrive at an outlook which is compatible with ecological sustainability. The goal is to see the longer term consequences of individual action so clearly as to resolve cooperator's dilemmas, and ultimately to establish the necessary degree of unforced "constraint" on individual action through internal resolution, not external pressure. We could ask whether social learning is part of the process of building social capital in all the above senses, just as individual learning is the process of building human capital and skills (which are of course distinct from formal knowledge, intellectual capital and intellectual property).

Finally, therefore, as a third possible approach to the role of social capital, we recognize that all this discussion of process is set within a context of perceptions, ideas and preferences which itself is changing and evolving. The significance of social learning, the role of advocacy coalitions, and processes of persuasion and argumentation in the evolution of ideas needs to be explored. Perhaps full realization of collective intent in the face of cooperators' dilemmas may demand a dramatic transformation in individual mind-sets or world-views of the sort Freeman emphasizes as "unlearning" (Freeman 1999). Or perhaps, as noted above, the "meme meme" needs to be more fully considered in understanding the cultural evolution necessary to achieve a soft landing to a sustainable economic growth path.

7. Conclusions

We live in a full world, in which the goal of sustainability must be central. That imperative demands a historically unprecedented degree of social coordination of individual action. This paper has suggested that a research program examining the role of social capital in social arrangements and governance processes to pursue the sustained well-being of citizens should examine at least the following questions and hypotheses:

1. **The contribution of (bonding) social capital to community processes aimed at adaptive management of individual action in complex and uncertain ecosystems as well as in complex social systems.** Such community-based management aims at achievement of compliance with collective decisions through coordination of individual action, the exercise of individual discretion within shared norms of conduct, the appeal to peer pressures and community influence in monitoring of action. Concerns with authenticity and performance practice are relevant here. One obvious hypothesis is that a discernible stock of social capital, contributing to more effective decisions, can be built up and nurtured through a history of successful experience with such direct, personal social engagement. These questions seem to be closest to the original Putnam (1993) concerns, resting on dense networks of civic association, and substantially focussed on a "service delivery" orientation. They relate to local dynamics, and find a place in what has been called "consensus organizing" and community economic development.
2. **The contribution of (bridging) social capital to more formal processes of deliberation, involving reconciliation of diverse views and interests.** One obvious hypothesis is that the degree of compliance achieved in community-based management with the collective decisions generated through more formal deliberations and institutions will depend on the extent of trust and confidence in these institutions, and on the perceived legitimacy of the decision processes

generating the collective decisions. More specifically, one might explore the hypothesis that the closer these processes come to meeting the criteria of communicative action, the greater will be the degree of compliance with the decisions emerging from such processes. One might also explore the role played by more personal experience in building bonding social capital even in epistemic communities or other virtual communities involved in deliberative processes to support formation of collective intent at more abstract level. Working together, even at long distance, may contribute to effective consultative processes, reconciliation of perceptions and integration of many ways of knowing in arriving at shared understandings.

3. **The contribution of (linking) social capital in achieving goals of effective subsidiarity in translating abstract covenants at large (possibly global) scale into realization through individual action at local scale.** One hypothesis is that the dark side of bonding social capital, which leads to exclusion and discrimination, can be contained through core guarantees of basic claims viewed as universal. In particular, fears of loss of agency may be reduced if minimal citizen control of the polity can be assured through the guarantees of democracy, and minimal control of economic power through the competitive forces of market capitalism within an accepted overarching framework of social principles. Shared agreement on universal assurances in the abstract global system of "enlightenment cosmopolitanism" can thus create the foundations for successively stronger membership claims or entitlements arising from bonding social capital in successively tighter definitions of communities (down to families).
4. **The importance of social learning in building and revising shared beliefs, norms and contexts in the face of new awareness and knowledge of the complex systems and uncertain settings within which collective decisions and individual actions must be taken.** One question to explore is the role of scenarios, visioning, simulation models or other decision support systems in building capacity, through advocacy, argument and learning, to change both beliefs about the world and values respecting conduct in it. Computer-mediated representation and communication of meaning may promote the building of shared context and norms (social capital) by facilitating reconciliation of differences or tensions along three dimensions (corresponding roughly to our distinctions between bridging, bonding and linking social capital):

   - beliefs about the nature of the world based on a synthesis of individual experience, traditional knowledge and expert understanding (as embodied both in models and in deliberation about results

from them)
- bonds linking felt individual obligations to respond to the needs of others in particular communities, now or in the future
- individual roles as a member of a range of different communities simultaneously, at different scales.

Social arrangements resting on computer-facilitated deliberation thus may contribute to sustained well-being by helping people to see more clearly the consequences for themselves of their actions generalized to aggregate outcomes. In other words, by providing a more vivid answer to the core ethical question – "What would happen if we all did that (behaved according to similar maxims)? – computer-supported citizen engagement may enable us all to surmount more effectively the problems of collective action and, therefore, move toward sustainability in a full world. Cooperation may be more clearly perceived as a practical strategy in the pursuit of individual well-being in the longer term. Altruism may be recognized, then, as simply self-interest properly calculated in a social context. This seems, at least, a hypothesis worth exploring.

In a full world, natural capital is a crucial determinant of limits to the pursuit of human well-being. The stock of social capital is a critical element in the reconciliation of human aspirations to well-being and consequent human activities with the unknown and probably unknowable ecological system which represents the limits on them. This paper has suggested that there may be a fruitful interpretation of bonding, bridging and linking social capital in terms, respectively, of engagement and commitment of citizens in Lifeworld; involvement of citizens in System; and interpretation of commitment in System to achieve compliance in Lifeworld. This discussion has also suggested that one may explore the evolution of social capital through social learning and growing social capacity in System, and in the emergence of cooperation through evolution and repeated interaction in Lifeworld.

Understanding the role of social capital and social arrangements in this context demands a vast research agenda, and a correspondingly vast hypertext structure to document the interdisciplinary span of ideas and languages. But would it not be a triumph for the OECD to be able to bring together its own diverse directorates within the framework of such a research program? Such a program would recognize that even the very specific goal of economic development demands reference back to the whole system of ideas and institutions, and the machinery of economic cooperation demands exploration of the role of individual action in formal organizations as well as in civil society.

Notes

[1] The ideas in this paper have their origins in work with the Social Learning Group, coordinated by the Centre for Science and International Affairs at Harvard University, and the Georgia Basin Futures Project, coordinated by the Sustainable Development Research Institute at the University of British Columbia. While of course assuming personal responsibility for views expressed and for any errors, I would like to acknowledge my debt to colleagues in both groups.

[2] There is no time, and indeed by now should be no need, to go into detailed arguments about the extent to which the scale of human numbers and economic activity may be pressing irreversibly against the limits of the natural systems which support life on this planet. (One can see Vernadsky 1945; Daly and Cobb 1990; Jacobs 1993; Grumbine 1994; Norgaard 1994, or any of many others.) The key point for present purposes is that in such a world, one faces inevitable congestion, spillovers and interdependence. Externalities spill off the pages of endnotes in economic exercises to become the outstanding feature of collective life in the real world. Market failure is seen to be ubiquitous. In addition, these systems are complex, if not chaotic; profound uncertainty is inevitable. They are also changing over many time scales. The social systems which coordinate individual action have somehow to take account, in the local processes and signals that shape individual behaviour, of this over-riding uncertainty at aggregate level.

Living within the limits of a full world thus demands global-scale institutions, a capacity to coordinate decisions across nations and across geographic scales (see, for example, Haas, Keohane and Levy 1993; Young 1997; Ostrom et al. 1999). Our emerging capacity to monitor the state of ecosystems, and growing awareness of their possible vulnerability, lead to changing social understanding of limits on overall human activity, and hence to the necessity of constraint on individual action.

The role of social capital in enabling communities to respond to these shocks, trends and new knowledge, to carry overall social intent cohesively into effective adaptive management on the ground, but taking into account the limits of a full world, is another way to pose the central question in the proposed conceptual framework outlined here.

[3] In this setting, there is a strong identification of the role of social capital and social arrangements with the goal of sustainability. That goal of sustainability, however, is quite distinct from the existence of social capital as a feature of a society, or social arrangements as processes for pursuing such purposes. Social capital has to do with the capacity of groups to work effectively for an agreed purpose (good or bad); sustainability is only one such purpose – though one which, being inherently concerned with the aggregate impacts of collective decisions, highlights dramatically some important features of the concept of social capital.

[4] The same is true as we look to the continuing negotiations on changing rules in the domain of international trade. In the aftermath of the failed negotiations at the OECD on a draft Multilateral Agreement on Investment, and the failed launch in Seattle of the WTO Millennium Round, it cannot be denied that the influence of individual civil society organizations (CSOs) in the global economy has become significant, and that global civil society in aggregate often has the capacity to establish, at least temporarily, "blocking coalitions" in the face of proposed collective actions – particularly economic initiatives – which are perceived to be unacceptable. The response of business leaders attempting, through groups such as the Trans Atlantic Business Dialogue and comparable domestic initiatives, to ensure that business perspectives remain dominant in global governance processes, has been swift. The need for institutional settings in which timely reconciliation of all these tensions can be constructively pursued is evident.

[5] One particular feature of such processes should be noted. Increasingly, problems of "science into policy," or more generally "knowledge into action," encounter the critical task of integrating public perceptions with conventional science or expert opinion (Jasanoff 1992; Social Learning Group 2001, Chapter 21). The tensions between what is seen by

the public as "acceptable" and what is thought by experts to be "sound" are increasingly sources of conflict in public policy and barriers to economic progress (Leiss and Chociolko 1994). Many of these problems stem precisely from concerns about the environment or sustainability such as those just mentioned, and increasingly will do so in the future. But that is not their essential feature. The central problem is the conflict between broad public perception and specialized technical expertise in the formulation of intent to engage in collective action. In that conflict, I would argue both the concept of "sound science" and the idea of the "rule of law" have been co-opted. They have been interpreted so narrowly, in the context of such a particular vision of the systems under study, that they have become, in the hands of international trade tribunals and the like, a conservative force serving the interests principally of only one social group, the owners of financial capital and paper claims. This appeal to allegedly objective technical expertise comes at the expense of the interests, perceptions and interpretations of risks and hazards held by the community more broadly, the owners of the many other forms of capital we recognize here. It also forces a short-term, consequential focus onto communities in which longer term norms of fairness and justice may be more fundamental.

6 Robinson and Tinker (1995) pose the problem of achieving sustained well-being as one of reconciling the imperatives of three distinct prime systems - economic, ecological and social. In a simplified Markovian model, the state of the system at any moment can be thought of as defined by the stocks of all resources and - crucially - the character at each instant of the webs or networks which connect them. The evolution of these stocks is described by laws of motion which we might hope to understand. The determination of flows at any moment follows from some optimizing calculation or rules of conduct expressing flows as functions of these stocks. Thus, following Robinson and Tinker we might think of laws of motion for the economic system (reflecting the optimizing behaviour of individual agents) describing the accumulation of economic assets, including physical, human and intellectual capital, for the ecological system (reflecting competitive and evolutionary processes determining stocks of natural capital) and for the social system (reflecting the processes we are discussing here describing the changing state of social capital). The pursuit of sustained well-being of citizens then reflects three dimensions, the essential goals with respect to each of these three systems (e.g. economic prosperity, ecological integrity or health, and social justice). Reconciling the imperatives of these three systems then presumably entails simultaneous achievement of minimum thresholds with respect to each objective, as constrained by the distinct systems dynamics or laws of motion for each of the systems. Whereas we as citizens have choice only within the laws of motion for the physical world, we can hope, through collective decisions, to influence or control the laws of motion themselves in social and economic systems.

7 Without embracing all facets of the Habermas argument, and certainly without doing justice to the richness and subtlety of the Habermasian concepts, the underlying distinction emphasized in this proposed usage is that between the ideal of civil society as the informal setting in which people relate to one another personally and directly, linked through communicative action, and the construct of System as the apparatus of formal organizational structures in which people act in hierarchical relationships, mediated through the contrivance of money and the workings of political power, invoking not personal but positional responsibility or morality in so doing. (See the translator's commentary in Habermas 1984, pp. xxiii-xxxii, especially p. xxi commenting on Habermas' account of modernity.)

8 Features of social capital of particular interest in the present context are the ways in which trust, confidence in generalized reciprocity and social cohesion facilitate the reconciliation of conflicting perspectives and the building of consensus around collective action. Given what is said above, a key role is played by continuing education or lifelong learning in building human capital (and hence creating capacity to participate in deliberative processes). Interesting distributional problems arise then around rights of access

to, or standing in, decision processes – particularly decision processes mediated through sophisticated information and communications technologies to which access may be highly unevenly distributed, in ways which correlate strongly with inequities in income and wealth distributions. An even more key role is played by public education and deliberative processes in shaping public perceptions of complex and contested issues, perhaps moving those perceptions toward greater appreciation of scientific understandings and expert interpretation of technical issues, thus making possible reconciliation of conflicting perspectives on issues where consensus must be built in the formulation of collective intentions. Sustained economic growth will not be possible without social capacity to achieve such reconciliation. With the resurgence of power exercised through civil society and democratic institutions, economic decisions that have significant distributional consequences cannot be determined by strictly economic calculation or simply on aggregate benefit-cost analysis or other consequential criteria. Acceptability (legitimacy) in the eyes of an empowered civil society will be essential to social approval for economic action and the pursuit of economic growth.

[9] The balance of this paper sketches a conceptual framework which emphasizes the contribution of social capital to the achievement of sustainability and well-being rather than to the intermediate or instrumental goal of economic growth as such. It argues that the pursuit of sustained well-being demands attention to natural capital and the need for dramatic social transformation as well as economic structural adjustment. Transition to, or progress toward, ecological and social sustainability demands resilient social systems and structures of social coordination which manage human activities within the uncertain carrying capacities of the Earth's life support systems, and which achieve widespread acceptance of the constraints on individual behaviour essential in doing so. Legitimate social processes providing an accepted means to adjust underlying notions of claims and property rights in light of emerging new understandings of these inevitably uncertain limits and constraints are particularly crucial.

Such an argument is, of course, highly controversial, hinging significantly on beliefs about the need for, or legitimacy of, social restraint on individual action. But there is also – and it is the point here – the substantive fact of changing understandings of the consequences and spillovers arising from individual action in complex ecosystems with uncertain properties of which we have only limited understanding. It is this fact which makes it essential to have accepted social processes that permit adjustment of individual rights and claims to property or access in the biosphere.

The role of social capital in governance – in supporting such processes, in facilitating the reconciliation of many interests and "ways of knowing" in the formation of collective intention, in addressing the "cooperator's dilemma" by linking such abstract collective intention to concrete individual action to realize that intention, and in monitoring compliance with it – is the focus of the argument here. That argument concludes with the suggestion that processes of social learning are a key element in building such social capital. In the end, processes of social learning will shape both how individuals come to visualize the consequences of their individual actions writ large in a full world, and how they evaluate or judge those consequences within a moral code which recognizes the need for willing, unforced constraint on individual action in social context and in a full world.

[10] There are also some concrete statistical questions here. Important explanations of social phenomena may well be masked if action shifting from one institutional setting to another moves outside the domain of systems that monitor particular institutions only. For example, in tracking care-giving activities in the "third sector" it is important to take into account the significance of a shift of primary care from home to public institutions, then offloaded to voluntary organizations. Or to take account of disintermediation more generally as internal activities shift from within organizations to external market transactions. OECD should aim for a comprehensive accounting stance to ensure that such shifts are not misinterpreted as disappearing activities or trends in fundamental human

conduct. (One illustration, for example, is in the problem Robert Putnam faces in tracking transitions among different kinds of civic or social activity, from formal to informal.) This consideration may also be important as the locus of interaction among citizens shifts to increasingly greater scale and institutional formality: social capital viewed as reflecting more abstract relationships may simply be substituting for unrecorded local encounters (de Vries 2000). On the other hand, one may also see a shift away from heavy emphasis on technical issues treated in processes internal to large organizations and toward more public involvement in more diffuse processes as the pressure to "democratize" both policy formation and policy analysis continues.

[11] There is also a larger concern with respect to these corporate instruments, namely whether the public at large has lost the control initially implicit in the granting of corporate charters, the power to assure that the privileges granted are exercised in the public interest – or at least not contrary to it. The recent book, *The Living Corporation*, by Arie de Geus (1997) of Royal Dutch Shell underscores the issue dramatically, with the argument that long-lived corporations inevitably work for their own survival, not necessarily for any instrumental purpose in the interests of owners, customers or the public at large. An expression of concern over precisely that prospect can be found in Grossman and Morehouse (1995).

[12] Interestingly, three decades ago Douglas Hartle's efforts to develop a foundation on which governments could rationally address the pursuit of well-being led him to a conceptual scheme focussed on the present value of memberships and the entitlements they carry, and hence the key role played in public policy by the interpretation of eligibility conditions (see Hartle and Bird 1971 for an early formulation.)

[13] This is perhaps the goal of a more nuanced view of assimilation coupled with respect for diversity. One may seek assimilation for all in a global economy and global polity, or global citizenship assuring core economic and citizenship rights (agency with respect to instrumental organizations), while at the same time seeking to guarantee continuing respect for cultural diversity, language and "other ways of belonging" to neighbourhoods, communities or nations. The relevance for First Nations in Canada, seeking assurances of cultural survival while moving successfully into an overarching constitutional structure and competitive global economy, is evident.

[14] Ursula Franklin's (1999) terminology, identifying issues arising in the interplay between the bitsphere and the biosphere (which she identifies with what Berman would call the ecosphere) seems preferable, but the idea is similar.

[15] The importance of the distinction can be illustrated by reference to the anecdote about the distinct roles played by the chef, the chicken and the pig in formulating and implementing plans for the ham-and-egg breakfast: the chef is involved; the chicken is engaged; but the pig is committed. Given the unknown distribution of the risks involved in continuing economic structural adjustment and community transition, citizens participating in community-based action must be considered both engaged and committed.

[16] Looking a little more closely into these processes of linking collective intention to realized outcome, we see the problem of the "cooperator's dilemma" emerge clearly in many settings (see, for example McGinnis 1999 or Kaul, Grunberg and Stern 1999). We also see the idea of implementation cast, on one hand, organizationally, as co-production à la Elinor Ostrom, and, on the other, as interpretation, à la Vincent Ostrom (both in McGinnis 1999). As interpretation, interestingly, we recognize the "performer's dilemma" in much the same form as it has emerged in legal theory, anthropology, musicology and theatre, not to mention literary theory (Taruskin 1995).

[17] Sabatier's work on policy advocacy coalitions also suggests ways in which social groups may come together around shared understandings of common goals and potentially efficacious strategies for their achievement (Sabatier 1999). This process of changing the base of knowledge on which policy action might be built represents an extension of Figure 2 introduced in this paper, but a less extensive schema than the processes of

social learning discussed in section 6.

[18] An OECD program in social learning and social capital should take seriously into account this growing body of work in experimental economics, which tends to confirm how widespread the traditional knowledge about the efficacy of norms of fairness and sharing is, and how particular to a unique school of indoctrination the inculcated reliance on the notion of rational economic man pursuing a self-interest signalled only by immediate exchange and immediate gratification is. Such an OECD program should look at how market institutions and decentralized decision making can be used for more effective agency, and more accurate delegation of responsibilities, within a framework that recognizes social capital as high context shared norms about constraint in the face of the imperatives of social and ecological sustainability along with economic prosperity (see the brief summary offered by Nowak and Sigmund (2000) and the references they cite to the streams of fascinating work at the Santa Fe Institute and the International Institute for Applied Systems Analysis).

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16

The Formation of Social Capital

Edward L. Glaeser

1. Introduction

The great explosion of research on social capital following Putnam (1993) has produced an impressive body of results confirming the importance of social capital in many different domains. Putnam himself documented a striking connection between organization membership and government quality. Knack and Keefer (1997) show that a one-standard deviation increase in a measure of country-level trust increases economic growth by more than one-half of a standard deviation. La Porta, Lopez-de-Silanes, Shleifer and Vishny (1997) find that across countries, a one-standard deviation increase in the same measure of trust increases judicial efficiency by 0.7 of a standard deviation and reduces government corruption by 0.3 of a standard deviation. Other authors have found connections between social capital and health at the individual level. There is also a clear correlation between membership in organizations and self-reported happiness.[1]

The quibbling econometrician could argue about whether these estimates are completely convincing. Social capital variables are surely correlated with many important unobservable characteristics that could be driving the observed relationship. While this annoying cynic would be right, he would also be missing the point. We are only at the beginning of research on this topic, and social scientists have already made a strong case that social capital is extraordinarily important in many domains.

Indeed, the weakness of this research is not in either the theory or the empirical work on the **effects** of social capital. The real weakness is the lack of both theory and empirical work focussing on the **causes** of social capital. If we are going to change the level of social capital, we must have a coherent model of the formation of social capital and a body of empirical work that we trust about the formation of norms and networks. This is not to say that Putnam and others have not done important work in this area, but rather that such work has taken the backseat to research documenting social capital's effects.

It is my view that from the very beginning of social capital research, the social sciences' approach to social capital has sabotaged attempts to understand its causes. Social capital is usually defined as an aggregate variable (e.g. the norms and networks of a particular community). However, decisions to invest in social capital are made by individuals, not communities. Without a definition of social capital that begins at the individual level, we cannot begin to understand its formation.

With this premise in mind, I hope to do three things in this essay. First, I put forward a definition of individual social capital that we can view as a counterpart to the community social capital that is the primary interest of the existing social capital literature. I discuss the conditions under which individual social capital aggregates up to community social capital. After all, we are interested in individual social capital only insofar as investment in this type of capital leads to the formation of social capital at the community level. In this first section, I put forward a simple economic model of investment in social capital and discuss its empirical implications.

In the second section, I discuss testing the most basic implications of this model. I discuss the evidence that shows that time horizons are extremely important in social capital investment. When individuals have a high probability of mobility, they are less likely to invest in social capital. When individuals are closer to death, they also eschew social capital investment. I then discuss the connection between investment and homeownership. Homeownership is an asset, the value of which is closely tied to the quality of the community. As such, it creates a direct financial incentive for investment in social capital. The evidence strongly supports the existence of such a connection. Finally, any sensible model would suggest that individuals in occupations that are more social will invest more strongly in social capital. This appears to be the case. One implication of the model is that when the opportunity cost of time rises, there will be less investment in social capital. We can find little evidence that this is true.

The third section of the paper deals with the variables linked to actions of the state that appear to strongly influence social capital. First, we discuss the connection between social capital and ethnic heterogeneity. New work by Alesina and LaFerrara (2000) proposes a clear model predicting a strong negative connection between ethnic heterogeneity and group membership.

Finally, I discuss the striking connection between social and human capital. There is no more robust correlate of social capital variables than years of schooling. While I cannot be sure why this connection is so robust, I do believe that this points to a central function of schooling. If social capital is valuable, and schooling plays a major role in creating social capital, this has implications for education policy.[2]

This essay is, of course, only a brief overview and cannot claim even the slightest element of conclusiveness. However, I cannot emphasize enough the need to begin with some individual-level model of social capital investment if we are ever going to understand the determinants of social capital formation. I believe the model I present here does well empirically and can serve as a useful basis for thinking about how investment in social capital occurs.

2. The Economics of Social Capital Formation

This conference has defined social capital as norms, networks and other related forms of social connection. I believe that the best way for an economist to think of community-level social capital is as the set of social resources of a community that increases the welfare of that community. These social resources, of course, include norms and networks. Economists tend to think that these social resources have value because they solve common economic problems. For example, better social connections can help solve the free-rider problem in providing public goods, or they can create trust between individuals in the absence of explicit contracts (hence, the frequent use of trust survey questions to capture social capital). I suspect that the direct effect of social connections on utility is probably even more important than these indirect effects. While this definition perhaps moves slightly from the norms and networks definition of Coleman (1990) and Putnam (1993, 2000), I am sure that it is really quite close, and is just phrased in the language of economists.

There is an older definition of social capital that is individual-based. In 1904, Henry James wrote about the social capital of a female character in *The Golden Bowl*, by which he meant her social resources. Indeed, following James, it would be possible to define individual social capital as the set of social attributes possessed by an individual - including charisma, contacts and linguistic skill - that increase the returns to that individual in his or her dealings with others. Such a definition is a precise analogue of the economic concepts of human and physical capital, and it is individual-based so we can think about the process by which an individual invests in social capital.

I do not mean to suggest that there is a conflict between an individual-based view of social capital and a community-based one. Instead, I believe that thinking about individual social capital is a prerequisite for thinking about the formation of community social capital. Since individual social capital is very close to human capital, much of the theory on investment in human capital can just be applied wholesale to social capital. The more difficult issue is aggregation. When do private social skills combine to create a more socially productive society? The issue is not as clear-cut as it may seem. For example, if a person invests in communicating well, clearly he or she is increasing the social capital of both himself or herself and society. If a person invests in learning how to swindle, that person is probably increasing his or her own social capital but decreasing the social capital of society as a whole. I will return later to the critical question of how to aggregate multiple types of individual social capital. First, I just review the simple economics of investment by individuals in social capital.

Investment in Social Capital

I repeat a simple investment model here to remind the reader of the rich set of comparative statics that can be generated with such a model. Social capital is best thought of as a stock variable *S* which yields each period both market returns (R_M) and non-market returns (R_N). Market returns include all social skills and connections that help one perform more effectively in one's job, as well as the role of social skills in getting jobs to begin with. Non-market returns include the wide range of social returns (perhaps including happiness directly) that can come from social capital investment. I will think of market returns as rising if the individual is in an occupation requiring more contact with other people.

There is a dynamic law of motion for *S* where $S_{t+1} = \delta S_t + I_t$, with $\delta = 1-\alpha$, where α represents the rate of depreciation of accumulated social capital and *I* is the level of investment in social capital. *S* would be best measured by the social returns that an individual receives, but things like organization membership are probably best thought of as proxies for *S*, although they might also be interpreted as forms of *I*. The level of investment, *I*, has a time cost *C(I)* (increasing and convex) which is then multiplied by the opportunity cost of time, denoted *w*. Individuals live for *T* periods and discount the future at a discount rate β. I also assume that with probability θ, the individual leaves his or her community. I assume that social capital has no value when the individual has left the community. Given these assumptions, privately optimal investment in social capital implies that in period *t*, individuals will invest to the point where marginal private costs (the cost of time, or *w*, times marginal amount of time needed for more social capital, or *C'(I)*) equals the marginal returns to social capital, or:

$$wC'(I) = \sum \beta_t \delta^{t-1} \theta^{t} (R_M + R_N) = \frac{(R_M + R_N)\beta\theta(1-(\beta\delta\theta)^{T-1})}{1-\beta\delta\theta} \qquad (1)$$

Differentiation of this condition yields the following basic results: social capital investment (1) rises with the discount factor, (2) declines with mobility, (3) declines with opportunity cost of time, (4) increases with the occupational returns to social skills, (5) increases when the rate of depreciation declines, and (6) declines over the life cycle. These are not surprising results – these would hold for almost any capital stock. However, they will give us a benchmark set of predictions when we discuss empirical facts.

Given that the stock of social capital is a function of the flow, these comparative statics (with the exception of the results about the life cycle) will hold immediately for the stock of social capital as well. In the case of social capital as the individual ages, if social capital starts at zero, there will generally be a period of social capital accumulation and often a period where the benefits from investment are too low to justify much investment. In that period, investment will often be too little to make up for depreciation. Thus, we would expect an inverted u-shape for the relationship between social capital and age.

The Aggregation Process – Two Types of Individual Social Capital

The previous investment equation just treated social capital as a single homogeneous good, but it is useful to distinguish between two types of social skills: those that increase the utility of the community as a whole and those that yield purely private returns. Indeed, some forms of individual social capital might actually lower the utility of the community as a whole. The simplest model incorporating two classes of individual social capital just assumes that a fixed fraction of social capital yields public returns. As such, the previous model provides a complete set of predictions about both individual and community social capital (i.e. exactly the same factors that predict individual social capital will predict community social capital). I will discuss these predictions in greater detail, but first we must consider the possibility that individuals may choose separately their investment levels in community-enhancing and community-neutral social capital. It would be quite surprising if individuals did not turn out to have such a choice.

Most obviously, factors that induce individuals to internalize the welfare of the community will increase investment in community-enhancing social capital. Elsewhere (DiPasquale and Glaeser 1999), I present a model where homeownership induces this internalization. A home is an asset, the value of which is tightly tied to the attractiveness of the community; therefore, owning a home will induce individuals to internalize the positive effects of their investment on the community.

It is also possible that longer expected duration in a community will mean that individuals internalize investment in the community to a greater extent. If an individual expects to move, he or she will be more likely to invest in skills that benefit himself or herself but not the community. If an individual expects to stay, that person will be more likely to invest in the community. It is also possible that past duration in the community will increase the altruistic attraction to other members of the community and create incentives for people to invest in kinds of social capital that make everyone better off.

One key aspect of community-enhancing social capital is that there are clear complementarities across individuals in this type of investment. Networks and languages are both pretty valueless if you are the only person who invests in these forms of social capital. They become valuable only if many people invest simultaneously. Returns to this form of social capital are rising in the level of community investment in social capital. (It is also possible that private returns to social capital actually decrease as more people invest in it. When people become more socially sophisticated, the skills of the car salesperson may wane in power.)

Complementarities across individuals are known to result in social multipliers (see e.g. Becker and Murphy 2001). Social multipliers mean that small changes in fundamentals can lead to large changes in aggregate behaviour. The idea is just that because of complementarities, as one person increases his or her level of social capital (in response to a change in fundamentals), that person causes everyone else's investment to rise as well. This type of social multiplier may help us to understand why only small changes in fundamentals may have led to the sizable 60-year increase and 40-year drop in social capital in the US between 1900 and 2000 (Putnam 2000).

This complementarity in community-enhancing social capital creates the possibility for multiple equilibria that underlies much of the thinking about the determinants of social capital. When the returns to social capital investment are higher in high investment communities, then there may exist some communities with high levels of investment and high returns to investment and some with low levels of and returns to investment. Both types of community will be in equilibrium, and this may lie behind the differences between northern and southern Italy discussed in Putnam (1993).

The combination of positive externalities and complementarity leads to strong gains from coordinating investment. Naturally, this creates the case for government intervention in social capital investment. Of course, private communities can also try to coordinate themselves. This coordination is easier if the community already has a stock of social capital. The idea that social capital feeds upon itself in this way supports the multiple equilibria view of social capital discussed above. Factors that decrease the ability to coordinate, such as ethnic and linguistic heterogeneity, may, therefore, hinder social capital investment. This type of heterogeneity may also deter social capital investment if individuals are discriminatory and consequently less interested in social contact with people who are different from them.

Since there is possibly a case for government intervention in social capital, it is worthwhile discussing the primary means through which the government can influence the investment decision. The government has policy tools through which it can influence homeownership or community permanence. These policy tools might be quite costly to use and there is no guarantee that the government will use them productively. Education may be the most powerful tool the government can use. If social skills are developed first in schools, then the 12 years that most Americans spend in public schools afford the government its greatest opportunity for influencing social capital. But we should again consider the warning that the government may be just as likely to make things worse as to make them better.

3. Social Capital and Private Incentives

In this section, I review basic facts about social capital investment and the predictions of the basic economic model of social capital investment. I will primarily discuss facts about membership in organizations, which is probably our best measure of social capital investment on the individual level. Generally, US data on social capital comes from the General Social Survey (GSS), which is a repeated cross-section of Americans. In this survey (administered by the National Opinion Research Center, or NORC), between 1200 and 2500 different people are asked a rotating set of questions each year.

The social capital literature has primarily focussed on two questions. First, there is a survey question on trust that asks: "Generally speaking, would you say that most people can be trusted, or that you can't be too careful in dealing with people?" Second, there is a set of questions about types of non-professional organizations that an individual belongs to. Generally, these organization membership questions are aggregated up to a variable (generally called "organization membership") that captures the number of different types of organizations to which an individual belongs.

I will generally avoid using the trust question, as elsewhere (Glaeser, Laibson, Scheinkman, and Soutter 2000), I have cast doubt on the interpretation of this survey item. Using experimental data, we have found that this question does not correlate well with real trusting behaviour either toward anonymous strangers or toward friends and acquaintances. This question does correlate surprisingly well with the level of trustworthiness (i.e. if you say that others are trustworthy, you are more likely to be trustworthy yourself), but not with the level of trust. This may mean that the trust questions are still useful for capturing social capital at the group level, but since interpretation is clearly quite difficult, I will avoid discussing these questions here, except insofar as the results are the same as those for the question on organization membership.

Again, there is a question about whether organization membership is a stock of social capital or a flow of social capital investment. I will generally think of it as a stock, but in most cases there is little loss to thinking of it as a flow. The only case where this is not true is in the relationship between social capital and age. The model generally predicts that social capital investment will decline monotonically with age (except if very young people are particularly impermanent). Social capital stocks will be non-monotonic.

Expected Duration of the Asset

The first comparative static is that as the expected duration of an investment declines, the amount of investment will also decline. In the investment equation, the parameters relating to depreciation, mobility and remaining life span all come from this basic intuition. I do not have any good measure of the rate at which social capital depreciates (although this is clearly a pressing topic for future research). However, we can create an expected mobility measure to predict the likelihood of an individual moving in the next two years. This probability of moving variable is created using age, marital status and number of teenage children, all of which strongly predict the probability of moving.

In Glaeser, Laibson and Sacerdote (2000), I present results looking at the relationship between this probability of moving and membership in organizations. There is a strong negative relationship (t-statistic of -7.5). A 20 percent increase in the probability of moving reduces the number of organizations joined by 0.15. Individuals who are more likely to move and lose their social capital are less likely to invest in that social capital. It is also true that duration in the community strongly predicts social capital (DiPasquale and Glaeser 1999).

Perhaps even more striking is the life cycle pattern of social capital. There is a very strong non-monotonic relationship between age and social capital. Glaeser, Laibson and Sacerdote (2000) show that people in their 40s are likely to be members of 0.56 more organizations than people in their 20s. They are also likely to be members of 0.46 more organizations than people who are over 60. There appears to be a clear inverted u-shape to the relationship between age and social capital, just as predicted by the theory. People first build up their stock of social capital and then rationally let it run down.

The Return to Social Skills

A second implication of the model is that individuals who work in occupations with more social contact are more likely to invest more in social connections. While I do not know exactly the social returns in different occupations, the GSS does ask individuals how important they consider contact with other people to be in their jobs. Answers are given as an index ranging from 1 to 7. Glaeser, Laibson and Sacerdote (2000) form an occupation-level index of this social returns variable so that we can rank each occupation by its sociability. Indeed, the index does apparently match up well with our priors about the returns to social skills. The least social occupations are "textile operative – knitter," "textile operative – winder" and "billing clerk." The most social occupations include physicians, clergymen and police.

There is a very strong relationship between non-professional organizations and sociability at the occupation level. The mean number of types of memberships is 1.06 for people in the least sociable occupations. The mean number of types of memberships is 2 for people in the most sociable occupations. Indeed, this relationship is both statistically significant and meaningful in its magnitude.

One worry with this variable is that membership in organizations leads to a sociable job and not the reverse. To check for this possibility, we look at the effect of the sociability of one's parents' occupations. This sociability measure strongly correlates with the sociability of one's occupation and also strongly predicts the level of organization membership. This suggests that occupation may be driving organization membership and not the reverse.

Homeownership

In DiPasquale and Glaeser (1999), we extensively examine the connection between homeownership and various types of social capital. We consider organization membership and also a large number of questions about local community political knowledge and involvement. Our focus is on variables that seem to relate to community-enhancing social capital (i.e. whether you have worked to solve local problems), which the theory predicts should be a function of internalizing the benefits to the community-level quality of such actions.

We find reliably strong connections between homeownership and a wide range of citizenship variables. For example, homeowners are on average members of 0.253 more types of non-professional organizations than non-homeowners. Homeowners are 15.3 percent more likely to vote in local elections than renters. Homeowners are 6 percent more likely to work to solve problems than renters. They are also substantially more likely to go to church or to own a gun.

Again, there is a worry that homeownership does not itself cause social capital investment, but rather homeowners are different in many ways and other differences are causing social capital investment. The first way we handle this problem is by controlling for a rich array of alternative variables (e.g. number of children, marital status, age, education). The homeownership effect is quite robust to these controls. Our second approach is to instrument for homeownership using local housing market variables. This approach also leaves the homeownership effect untouched.

Our third approach is to use German panel data where we can observe the same people over time. With these data, we can test whether individuals become better citizens when they become homeowners. We find that this is the case, although the effect of homeownership is considerably weakened when we look at behaviour of the same person over time. One possible explanation for this weakening is that the effect of homeownership may require time to take effect.

The Opportunity Cost of Time

One of the predictions of the social capital investment model is that increases in the opportunity cost of time will generally lead to less investment in social capital. The most usual measure of the opportunity cost of time is the wage, but social capital investment does not fall with wages. Indeed, social capital investment is almost always higher among more successful people. One possibility is that this comes from the social capital-education connection and that higher wages are actually proxying for better education (I will discuss the reasons for the social capital-education connection later). An alternative possibility is that higher initial social skills lead to higher wages and higher investment in social capital.

One piece of evidence on the importance of the opportunity cost of time hypothesis is the role of television. Putnam (2000) argues that watching television has decreased investment in social capital. There is also clear evidence for a negative correlation between hours spent watching television and social capital variables (although I have argued elsewhere that this connection is not large enough to explain the cohort trend in the trust question). The natural interpretation of the role of television is that it creates a substitute social activity that makes investment more costly. Thus, while I do not know of any evidence suggesting that higher wages crowd out social capital, the evidence on television watching does seem to corroborate the importance of opportunity costs.

4. Two Other Influences on Social Capital Formation – Ethnic Heterogeneity and Education

In this section, I discuss two other variables that appear to be closely related to social capital formation. First, I discuss education. Then I discuss ethnic heterogeneity.

Social and Human Capital

Unquestionably, the most robust correlate of social capital variables across individuals is years of schooling. For example, the raw correlation of years of education with membership in organizations is 34 percent in the GSS. Using the World Values Survey (an international version of the GSS), Glaeser, Laibson and Sacerdote (2000) find a positive relationship in almost every country. This fact is true for almost every measure of social connection within America. Church attendance rises strongly with education. Working to solve local problems is almost 30 percent higher for people with college degrees relative to high school dropouts. There is also an extremely strong connection between education and trust (again the gap between high school dropouts and college graduates in saying "yes" to the basic GSS trust question is around 30 percentage points). The education-social connection relationship should probably be seen as the most robust and most important fact about the formation of social capital.

Of course, there are many possible interpretations of this relationship. For example, if education reflected a greater orientation toward the future (i.e. higher discount factor), then we should not be surprised that people with more human capital also invest more in social capital. Alternatively, social capital may be reflecting relative prestige and it may be that interacting socially may be more pleasant for more prestigious individuals. One piece of evidence that supports this interpretation is the fact that the relationship between education and organization membership within states or countries is much stronger than the relationship between education and organization membership across countries.

However, my preferred interpretation of the social capital-human capital relationship is that a significant part of education is learning social skills. A great deal of time is spent in schools learning how to deal with peers in an educational setting. Moreover, teachers explicitly undertake training students in appropriate behaviour in a variety of social settings (at the very least, teachers educate students in dealing with an adult figure in an authority position).

In younger grades, learning cooperation exists as a major part of the education process, but I do not believe that learning social skills in school stops there. Even in college (relative to working), a great deal more time is spent on constructive social activities. Indeed, many times membership in fraternities or sororities serves as the basis for social capital formation later in life. Sports are also often explicitly oriented toward learning social skills.

If schools are a primary area where social capital is developed, then it is natural to think that government policy toward social capital should focus on schools. Presumably there are choices about education policy, both in terms of subsidizing education and in terms of structuring public education, that should be made with the thought that education creates social skills. Indeed, the vast governmental involvement in education becomes much more comprehensible once we think about education's role in creating externality-producing social capital.

Ethnic and Linguistic Heterogeneity

A final factor that appears to be important in creating social capital at the community level is ethnic and linguistic heterogeneity. It is a well-known fact that the highest levels of human capital within the US are in the states of the Old Northwest, which are among the most homogeneous in the country. Many authors have identified the percent Lutheran effect or the Scandinavian effect on social capital, which appears to be linked to the relative homogeneity of these areas. Indeed, out of the six countries with the most social capital, four are Scandinavian. At the bottom of the list of countries is Brazil, which is an enormously heterogeneous area. Ethnic heterogeneity is joined by heterogeneity of education and income, both of which also appear to depress the acquisition of social capital.

Alesina and LaFerrara (2000) convincingly document the negative effects of heterogeneity on social participation across American states. Their model focusses on the idea that if you discriminate against people who are different from you, then it becomes less pleasant to join social organizations when the state is heterogeneous. An alternative explanation is that forming social capital requires coordination and coordination is more difficult when people are different.

The importance of heterogeneity is a cause for concern. It presents us with the unpleasant suggestion that homogeneous communities may have some advantages. On the other hand, it may mean that there are particularly high gains from government actions which eliminate the gaps across races and which reduce the amount of ethnic discrimination.

5. Conclusion

The formation of social capital is a crucial topic for both positive social science and for the policy agenda of improving the level and composition of social capital. I argued here that a simple economic model of social capital investment based closely on economic models of investment in human and physical capital works well for predicting the determinants of investment. Individuals are more likely to invest in social capital when they have longer time horizons in their communities. They first build stocks of social capital and then let those stocks decline. They invest in social capital more when they are in more social occupations. Homeownership increases the level of investment in social capital. The individual-based model of social capital fails only in that there is little evidence that investment in social capital declines with the opportunity cost of time.

Social capital investment is particularly strongly driven by education levels and by community homogeneity. Indeed, the number of years of schooling is generally the single strongest determinant of any number of social capital-type variables. This connection remains something of a puzzle, but it suggests that government education policy may be a particularly important way to address social capital investment. It is also true that community homogeneity strongly increases social capital investment. This might mean that government actions to lessen divides across races or ethnicities may be helpful.

Notes

[1] See, for example, Chapter 20 of Putnam (2000).

[2] The relationship between education and social capital is by no means an open-and-shut issue. Helliwell and Putnam (1999) provide both a summary of and a contribution to the debate on this issue.

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17

Balancing Economic Growth with Well-Being – Implications of the Japanese Experience[1]

Takashi Omori

Human and Social Capital Supporting Japanese Rapid Growth

In Japanese and Asian development, human capital was essential, especially in accumulating technology through learning by doing. Social capital also played an important role, through mutual trust within the general public and thorough cooperative behaviour among colleagues and between companies that held long-term relationships.

However, just like physical capital, human and social capital may become obsolete. Some aspects of society that helped Japan to grow quickly have disappeared and are being replaced by market mechanism and formal institutions.

Social capital has three dimensions: 1) it substitutes for markets and institutions, especially in developing economies; 2) it complements markets and institutions, and 3) it can be a direct foundation for well-being.

The best balance between the economic implications and the direct benefits of human and social capital may be different across countries, depending upon culture and history. This is because there is a substantial degree of institutional complementarity and path dependency in the dynamics of human and social capital.

Even with the internationalization of economic activities, differences in human and social capital can remain, and they will put different pressures on future development of technology. Such differences will become an increasingly important source of comparative advantage.

This paper tries to clarify the role and implication of human and social capital in achieving economic growth and enhancing well-being. In the first section, I discuss human and social capital as a background of the rapid development of Japan and Asian countries, with an emphasis on the interaction between the two. Next, I argue that both human and social capital are context-dependent in the sense that they may become obsolete, based on the Japanese experience where accumulated capital has become less useful. I discuss some implications of the new technology in the following section. Finally, I summarize economic implications of social capital by categorizing it into three groups.

Historical Background

Japan had been closed for more than two centuries, and developed as a unique society. When Japan decided to open the country and to catch up with the industrialized world, there was a unique composition of human and social capital.

In terms of human capital, the literacy rate was relatively high. This is partly because many feudal lords placed importance on learning and technology, and facilitated education. It is also because poor people tried to give their children elementary education. By 1868, 219 institutions of higher education and more than 10 000 primary schools had been established. In certain areas of mathematics, researchers were of international calibre. However, knowledge of modern technology was scarce. The mode of inland transportation, for example, depended almost entirely on human and horsepower.

In terms of social capital, it is not easy to define what it is in a clear-cut way. However, broadly speaking, Japan's situation was perhaps better than that of major developed countries at that time. Indeed, many foreigners found Japanese society extremely open and friendly with little crime. Ludovic Beauvoir, a young French count, after travelling to many counties, found Japanese people "the most courteous in the world" (1881, p. 31, 23 April). Isabella Bird, an English woman, emphasized that Japan was a country where a lady can travel around on her own, and she did so herself (1880).

Lev Ilich Metchnikov, a Russian teacher, wrote "Here, however poor or exhausted a porter may be, he would never behave without courtesy" (1883-84, p. 126). There were numerous such observations.[2]

One notable example of how mutual trusting was prevalent was in the early 18th century, when there was a well-developed futures market for rice – the world's first futures market. This would not have been possible if participants did not trust commitments.

Given that Japan had few natural resources on which to rely, its rapid development owed much to human and social capital.

Just after opening the country, the government was very keen to invest in human capital. A large proportion of the budget was allocated for inviting excellent scholars and engineers from advanced countries on very favourable terms.[3] Young students sent abroad were given important posts after coming back.

Development After the Second World War

The rapid recovery after large-scale destruction during the Second World War was also an example of the importance of human and social capital. Japan lost a substantial proportion of national wealth during the war, and there was little modern productive equipment left. But there were people and a society that had a memory of the past. In addition, reforms made by the occupation army helped to improve human and social capital. They forced military people out of the government, redistributed farmlands to small-scale farmers, and introduced active competition by breaking down large company groups. Based on such renewed soft infrastructure, Japan was able to achieve rapid economic growth.

Social Factors Behind Growth

It is worth noting that many aspects of the so-called "Japanese system" were formed and established after the war. There are a number of studies examining the factors that facilitated growth. If social capital is broadly defined to include interpersonal relationships that affect efficiency of the economy, several factors can be listed:

- the way people coordinate themselves
- the degree to which people trust each other
- the way workers cooperate within firms
- the way workers cooperate across firms
- the efficiency of the labour market in allocating the right person to the right place
- the extent to which management encourages workers to improve their skills
- the trustworthiness of the people in business from the viewpoint of customers
- the reliability of the infrastructure
- the extent to which people trust and cooperate with the government.

The social factor that enabled rapid economic growth, of course, includes the narrowly defined trust and cooperative attitude as a relationship between anonymous persons in the economy, namely the first and second factors in the above list. However, at least equally important were the interpersonal relationships, corresponding to the next four factors in the list.

Cooperative Attitudes in Long-Run Relationships

Haruo Shimada (1988) created a new concept, "human-ware," as opposed to hardware and software. He argued that the basic reason for the strong competitiveness of Japanese automobile companies was the cooperative attitude of the workers. He quoted a Japanese worker: "In a US company, each worker is eager to make his individual success, and unwilling to tell what he knows to his colleague. But here, everybody is willing to tell what he knows as much as possible to the colleague. This is because he believes that he can make a success only as a team, not on his own" (p. 61).

This is partly an issue of management, but also one of interpersonal relationships, as well as of employment systems and of labour markets. In a country where long-term employment is dominant, it is worthwhile to work for the success of the whole team. By so doing, one can expect not only the benefits from future prosperity of the firm but also respect from colleagues with whom the employee will spend a large proportion of his or her lifetime. In such a labour market climate, a job seeker who quits a company after only a short period of service would tend to be regarded poorly. As Otaki (1994) points out, this is a self-reinforcing mechanism. If job seekers in the second-hand market are judged to be inferior, more people would prefer to stay in the company than otherwise. Thus, workers accumulate company-specific skills rather than general skills.

Cooperative behaviour among firms is also thought to have aided the development of Japan's manufacturing sector, especially in the consumer durable sector. In drafting a design of a new car, for example, Japanese car producers took full account of the views of parts makers, as well as those of retailers, and tried to find the best match of cost reduction and consumer satisfaction. This was possible only based on mutual trust, which was strengthened by strategies such as cross holding of equities and temporary exchanges of workers between firms.

Such long-run relationships and mutual trust were helpful in reducing informational costs, not only in designing a new product but also in drawing up contracts. Contracts were usually just broad agreements and specific conditions were discussed later on. Contingent and conditional contracts were seldom thought of.

What was perhaps equally important was the trustworthiness of the people in business from the viewpoint of customers, and trustworthiness of infrastructure, namely the second and third last points in the above list. Although it is difficult to pick up a single indicator, the low defect ratio, punctuality of railways and postal service, reliability of electricity and telephone networks, and sincere handling of consumer claims have all been features of the Japanese economy. These favourable social conditions encouraged human capital formation, as they provided incentives for effort and ideas by guaranteeing that they can be rewarded without being disturbed by the failure of somebody else.[4]

Consensus Formation

Regarding trust in the government, the final point in the above list, let us look at the role government played in forming a consensus on the direction in which the economy should move.

Japan has an established tradition of official economic planning. Rapid economic growth, such as that recorded in the 1970s, was often seen as a notable example of successful economic planning, as the third plan explicitly called for "doubling national income." The plans show not only policy emphasis on the future but also macro-economic projections.

Council Works for a Consensus

It is the Economic Council, not the bureaucrats or politicians, that works on a draft plan for cabinet approval. The Economic Council is a group of people nominated by the Prime Minister. Its members are chosen to represent various social and economic groups, such as business executives, labour unions, consumers, academics and ex-bureaucrats. An example of such composition is shown in Table 1. The Council is not large, and the meetings are not frequent; however, intensive and frequent discussions are conducted by various subcommittees.

Table 1

Composition of the Economic Council (Main Committee)

Industry	6
Ex-bureaucrats	7
Academic	4
Press	3
Labour union	3
Finance	2
Consumer	1
Central bank	1
Total	27

Note: Author's own calculation as of March 2000.

Complement of Future Markets

It is often said that an economic plan in a market economy is an indicative plan, in the sense that it has no compulsory power to direct private economic activities but indicates what is desirable and feasible. Japan's case is no exception. However, it seems that Japan's economic plan has some additional characteristics. First, plans are made taking into account views of various participants of the economy as much as possible, as is reflected by the Council's composition. Thus, the planning process can be regarded as a place for soft negotiations among social partners over macro-economic issues and for information exchange.

The fact that a large amount of information is exchanged among Council members indicates that the process complements the market mechanism. Although economic textbooks assert that the market mechanism is efficient, there is an important prerequisite: that every future market exists. This is clearly not the case in the real world, which is full of uncertainties. If market participants are informed of the background of their partners' likely responses to possible changes in the environment, they can be better prepared than if all the information is processed through changes in prices and through contracts.

Consensus Versus Vested Interest

Second, the economic plan is used to confirm the general direction, when specificity is difficult to implement. A notable example is the need for deregulation. Almost everybody agrees upon the need for liberalizing the economy further, mainly through relaxing or abandoning outdated regulations, and further opening of the domestic market to international trade. However, when it comes to choosing which regulation is to be abandoned, the discussion may become difficult, as each such change would endanger some vested interests. If the general direction has been emphasized in the plan and if it has been shown in the plan that such a direction would bring about better economic performance, it becomes easier to embark upon specific reforms.

Challenges for Economic Planning

The recent long recession and volatile asset prices made it clear that the market economy is not complete. However, direct government intervention or regulation may weaken economic incentives for productivity improvement. An indicative plan can play an important role as it provides a channel for exchanging information on the future among participants of the economy, a channel different from price signals.

It is true that economic projection as well as consensus building has become difficult because of increased uncertainty. Uncertainty has increased partly because of the internationalization of economic activities, partly from increased speculative activities, and to some extent because of decentralization of decisions. As a means to reduce costs deriving from uncertainties, indicative plans can play a more important role under increased uncertainty, with the following modification.

First, the informational aspect of the planning process has to be underlined. Frank and open discussion is crucial. Second, discussion of contingencies is helpful, rather than sticking to one scenario which is based on ad hoc and wishful assumptions. The whole set of "what if" questions has to be addressed in the planning process. Third, international interdependence has to be more thoroughly taken into account.

Human Capital in Asian Development

Fukuda, Kamiya and Toya (1995) found an asymmetric growth effect of human capital between East Asia and other countries. By estimating a growth convergence equation, extended to take into account human capital, over a cross-section sample of 101 countries for the 1970 to 1985 period, they found that:

1. Growth convergence theory did not hold for East Asia, if human capital was not taken into account. But it was supported by the data if human capital was included. That is, the long-run growth rate was

not only dependent on initial real income level, but also on the investment in human capital, measured by the Gross Domestic Product (GDP) share of government expenditure on education.

2. The human capital variable, defined by education spending as a share of GDP, was negative and statistically significant in their growth rate equation for the whole sample, but positive and significant for East Asian countries.
3. The human factor was insignificant if measured by enrolment ratio for junior high schools.

Concerning the difference between East Asia and the rest of the sample, they pointed out that the former depended heavily on exports. Since they thought that the human factor was important in export-oriented industries through the learning-by-doing process, they argued this was why education spending positively contributed to the growth in their estimation for East Asia. They found that the addition of GDP share of exports to their equation made the coefficient of initial real income level more significant, implying stronger support for the convergence theory.

Human and Social Background of Growth Slowdown

Since the beginning of the 1990s, Japanese economic growth slowed down substantially. The average annual growth rate in the 1990s was 1.4 percent as opposed to 4.0 percent in the 1980s.[5] There are many possible reasons behind such a marked slowdown, including satiation suggested by the growth convergence theory, collapse of bubbles in asset prices, catch-up by Asian newly industrialized economies, and mismanagement in fiscal and monetary policy. I do not go into detailed discussion of the above listed factors, as a number of excellent analyses have already been made. Instead, let us examine the economic growth slowdown from the viewpoint of human and social capital. There has been an increasing mismatch between the needs of the new economic era and the current stocks of human and social capital.

Social Capital as a Risk Diversification System

Increased Needs for Risk Processing

In a market economy, economic agents are faced with uncertainty, and almost any economic decision, investment or saving involves risk taking. Generally, households are risk-averse, and become increasingly so as they gain wealth. But on the other hand, as an economy develops, there tends to be increased uncertainty in the supply side of the economy. This became apparent when the Japanese economy had caught up with the US and Europe. Japanese firms were increasingly required to make their own way, rather than replicate what US and European firms did. Another reason for increased uncertainty is that people have become more or less satiated with basic commodities, and it became difficult to make a correct forecast about what goods and services would sell well.

Thus, what is crucial is a transmission mechanism between risk-averse individuals and risk-taking companies. Until the 1990s, this had been achieved based on a unique land-value-based system. With respect to the financial channel, there were two major channels for so-called "risk capital," the capital that is used for high-risk/high-return projects. One is unrealized capital gains. This is the difference between the market and book value of the land and equities held by large companies and banks. Partly because of weak surveillance by the capital market, which was made more difficult by the extensive cross-holding of equities, managers tended to think that the unrealized capital gains were at their disposal and within their discretion. The other channel was bank loans made to small- and medium-sized firms based on land collateral. With the expectation that land prices would never fall, banks did not scrutinize the use of the loans they provided.

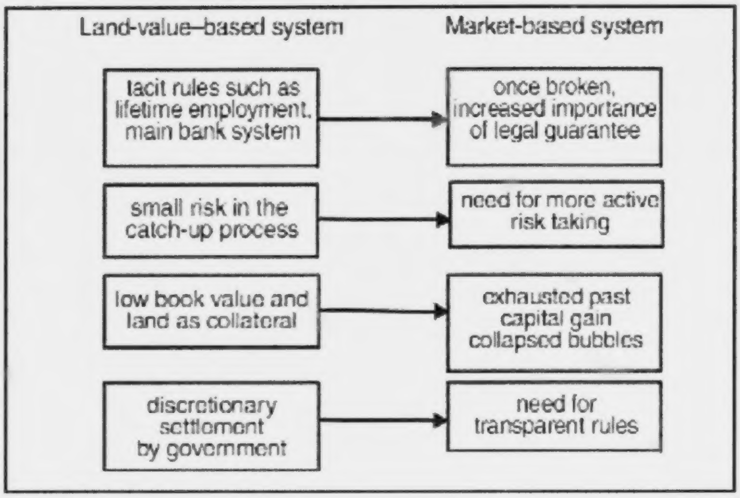
Based on long-term relationships, there were many tacit rules. One example was the "main bank system" under which the main lending bank monitored the management of a company and took the major responsibility, in the sense that if the company went wrong, other lenders suffered only after the main bank gave up all its claims. Another example was the long-term employment principle, under which workers could expect life-time job security. In addition, government played an important role in critical situations. For example, the government used to ask large, sound banks to absorb a deteriorating one, with no compensation.

In effect, Japanese firms, banks and households were rather insensitive to financial risks they faced because risks were "socialized," in the long-term relationship, in the reliance on the government discretion and in the expectation of ever-rising land prices.

However, because of the collapse of the financial bubbles after 1990 and the financial crisis in 1997, this system ceased to work. When some banks could not adhere to the main bank rule, doubts spread to other cases. As some famous companies gave up guaranteeing job security, households became uneasy about future income. In addition, the two channels of risk capital became choked as land prices fell. This is why it was necessary for Japan to build up a new system of risk processing, which would depend more on capital markets, explicit contracts and on legal procedure, and less on mutual trust (Figure 1). Japan may have exploited social capital too much and exceeded the threshold over which mutual trust quickly deteriorates.

Figure 1

Needed change in risk-diversification system


Land-value–based system
Market-based system
tacit rules such as lifetime employment, main bank system
once broken, increased importance of legal guarantee
small risk in the catch-up process
need for more active risk taking
low book value and land as collateral
exhausted past capital gain collapsed bubbles
discretionary settlement by government
need for transparent rules

Heterogeneity Versus Homogeneity

Japanese education placed priority on producing a large number of workers with standardized knowledge and skills, which would enable them to import and absorb foreign technology and improve it marginally. There was also a preference for human capital fitted and willing to participate in teamwork rather than innovators who tended to be independent from colleagues. Human capital of such a nature worked well up to the 1980s. Good teamwork in a factory was the base of incessant process innovation, and cooperative attitudes among companies were the basis for Japan's competitive manufacturing sector.

However, as companies and banks grew large, the responsibility of individual workers became obscure. Under the bureaucratic rotation system, basic and difficult problems such as insolvent loans were left untouched until the arrival of a successor, who repeated the inactivity of the predecessor with a hope that the problem would remain "under wraps" during the bureaucrat's service period. Moreover, it has become clear that many executives, even among the best educated, either committed or permitted illegal accounting practices. In the lifelong employment system and with little non-company-specific skills, they became opportunists and dared not point out the defects of the Emperor's New Clothes.

Human resources devoted to education kept increasing. Many schoolchildren go to preparatory schools in the afternoon or evening with a view to gaining entrance to competitive high schools and eventually to prestigious universities. What they are taught is how to solve ready-made questions quickly, rather than how to set up a new question or how to apply a new methodology to a new question.

Since Japan has become one of the front-runners in the world economy, human resources with creativity, leadership and heterogeneity are called for, rather than those with obedience, diligence and homogeneity. The latter are the dominant features of the current stock of human capital. Previously successful methods of mass production of automobiles cannot be so easily applied in an era of high technology, because the essence of the latter lies in creative ideas, not in efficient mass production.

Market Versus Non-Market

From the viewpoint of foreign firms and investors, the long-run relationship among firms and the "risk-socializing system" were often claimed as entry barriers and lack of transparency. In view of internationalizing Japan's financial markets, it was and is necessary to express the financial status of companies in a more transparent and internationally understandable way. Otherwise, financial markets cannot correctly assess the risks each company faces. Thus, internationalization requires that some aspects of social capital, such as implicit long-term contracts, implicit government guarantee or mutual trust be replaced by explicit contracts.

Growth Implications of Social Capital – Investment Versus Savings

Even during the stagnant period since 1990, the ratio of investment to GDP stayed relatively high in Japan. This may be explained as influenced by the rich stock of social capital, in line with Knack and Keefer (1997). However, the fact that this high investment ratio is not accompanied by a high growth rate seems to indicate that there is another possible interpretation, leading to a quite different macro-economic implication.

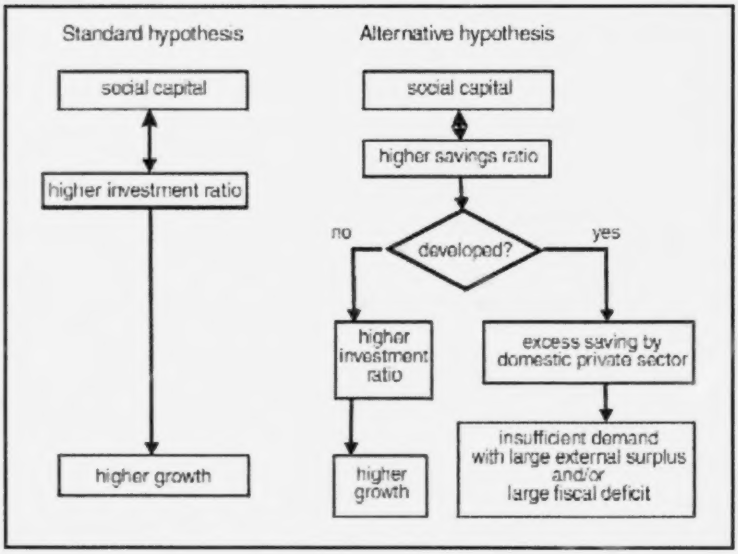
The alternative hypothesis is that rich social capital pushes up the savings rate rather than the investment ratio. There are several possible reasons why this may be the case. First, higher credibility of the future working of the economy may lower the time discount rate of the people. Secondly, socially minded people pay more attention to the interests of their descendants and their contemporary neighbours, and thus tend to leave more bequests. Thirdly, there may be some cultural or religious background leading to trusting each other as well as saving more.

The positive correlation that Knack and Keefer found between social capital and investment may be the combination of the two things – a correlation between social capital and savings ratio, and the one between investment and savings. Although the latter correlation may be getting weaker with the greater internationalization of capital markets, it is still significant, especially for a country whose currency is subject to a large fluctuation.

If the alternative hypothesis holds, social capital has a different implication for growth depending upon the development stage. In a developing stage, rich social capital is an advantage, as it provides sufficient amount of domestic savings to finance investment, while foreign capital may be reluctant to flow in due to the country risk or uncertainty about future exchange rate. On the other hand, for a developed country, with slower or negative population growth, and with lower potential growth rate,[6] required investment is smaller than before. Thus, rich social capital would lead to insufficiency in domestic private demand and either large current account surplus or large fiscal deficit (Figure 2).

Figure 2

Growth implication of social capital


Standard hypothesis
social capital
higher investment ratio
higher growth
Alternative hypothesis
social capital
higher savings ratio
developed?
no
yes
higher investment ratio
higher growth
excess saving by domestic private sector
insufficient demand with large external surplus and/or large fiscal deficit

However, quite the contrary can be argued with respect to savings. If an important part of savings is of a precautionary nature rather than of a life cycle nature, an economy where family ties are strong enough to pool the financial risk of getting ill or bedridden, there is less need for precautionary saving, even if the public insurance system is underdeveloped. Thus, social capital in this sense decreases savings.

All this suggests the necessity of more empirical studies that would take due account of interaction among various aspects of social capital, savings and investment.

Social Capital and Well-Being

Although some of the aspects of social capital have become obsolete, this does not mean that the direct link between social factors and well-being has changed. Education is something more than an economic investment in human capacity. The fact that estimated internal rate of return of education is often lower than the market interest rates,[7] and the fact that there are always "reckless young people" who wish to go to schools that their parents would not recommend, are indirect evidence of the non-economic benefits of education.

The same may be true for social capital. Small income disparity in Japan,[8] for example, may be affected by the institutional setting, which may place too much emphasis on equality in results rather than equality in opportunities. However, most people accept the former "good and desirable" without any convincing reason, even if there should be a trade-off between equality and average incomes.

The best balance between the economic implication and the direct benefits of human and social capital may be different across countries, depending upon culture and history. This is because there is a substantial degree of institutional complementarity and path dependency in the dynamics of human and social capital. Even if preferences of people are universal within a nation, their implications can differ according to the institutional setting and social conditions. Social conditions are, in turn, importantly affected by the actions of individuals. Moreover, a person's preference is naturally influenced by the characteristics of the society in which he or she was born and brought up.

There may well be multiple equilibria, each consistent in itself. One possibility is that people and firms have long-term trust in each other, with low information costs, but with little pressure from price competition and from international competition. Another possibility would be that people stick to contracts and lawyers under a transparent competitive system and try to attract the best ideas and people from the world.

Thus, economic policies, especially structural policies, must be carefully managed, paying due attention to the consistency with social policies. A reform program must lead to a mutually consistent set of social and economic status. Moreover, sufficient degree of consistency has to be kept during the transitory period. Loss of consistency along the way would invoke loss of political support for the whole reform. A seemingly straight path toward the top of the mountain may lead you to a dead end under a cliff.

Social Capital and New Technology

Internet as New Social Capital

In December 1998, one consumer, who was not satisfied with a video recorder, made a complaint to the major electric company that produced it. After a chain of arguments with several branches of the company, a special public relations clerk responded to him. Then, the clerk used inappropriate words in an impolite way. Having tape-recorded the conversation, the customer sent the recording to the president of the company asking for an apology. When he did not get an answer, he opened an Internet homepage in June 1999, presenting the recorded tape. Within a month, the number of hits on his homepage reached 1.65 million, and some newspapers took up the issue. Finally, the company admitted its fault.

This indicates that even a single consumer can affect the reputation of a gigantic firm, and that the distinction between personal communication and mass communication has become unclear.

Thanks to the Internet, costs of information searching, sharing and exchange have dramatically decreased. If the essence of social capital lies in its informational aspect, it should have a long-lasting impact on the significance of social capital, and a new dimension of social capital may become important. However, exact implications remain to be clarified.

Social Capital as Comparative Advantage

Internationalization of economic activities is making economies more homogeneous. One example would be convergence of factor prices induced by free trade. The development of information technology is expected to reduce international technology gaps. Even so, technology and products may not converge. Different economies have different constellations of human and social capital and each constellation has different preferences for technology and places different pressures for future development.

One such example is the "convenience store" in Japan, a kind of drug store which is open 24 hours, and located on every corner in the cities. This is one of the few growing business categories in Japan, supported by social factors such as an increase in the number of single people, an increase in night work and, most importantly, low crime rates. Besides selling books, foods and beverages, they handle account settling for telephone and electricity bills, keep parcels for collection by neighbour customers, reserve and issue theatre tickets, and so on. Now, some of them are going to establish a bank terminal within each branch and start delivery service of commodities ordered by e-trade. Thus, convenience stores are increasingly becoming an essential infrastructure for Japan's city life.

Conclusion

For Japanese and Asian economic development, human capital was essential, especially in accumulating human-embodied technology through learning by doing. Social capital or social factors also played an important role, partly through mutual trust among the general public and partly through cooperative behaviour among colleagues within firms, and among companies linked by long-term relationships.

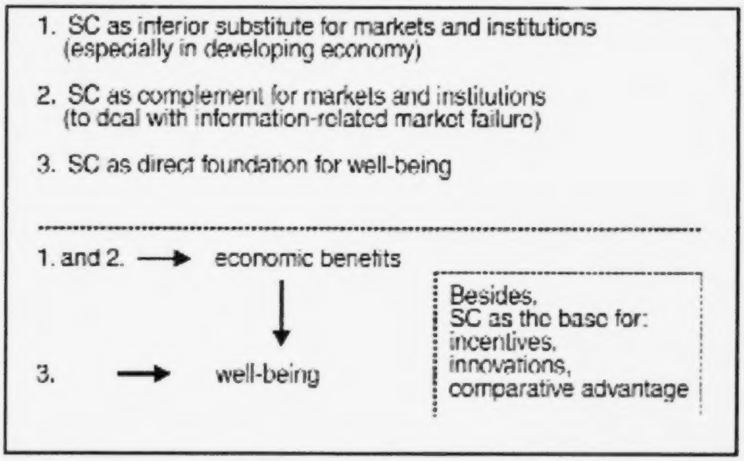
However, the growth implications of human and social capital are not permanent. Just as a piece of physical capital equipment is useful or useless depending upon changes in technology or consumer preferences, human and social capital may become obsolete. Some aspects of society which helped Japan to grow quickly have disappeared and are being replaced by market mechanisms and formal institutions.

Whatever the economic implications may be, some directions of human and social development are desirable if they are directly connected to the well-being of the people.

Thus, various components of social capital can be classified into three categories as in Figure 3.

Figure 3

Three categories of social capital (SC)


1. SC as inferior substitute for markets and institutions (especially in developing economy)
2. SC as complement for markets and institutions (to deal with information-related market failure)
3. SC as direct foundation for well-being
1. and 2.
economic benefits
3.
well-being
Besides, SC as the base for: incentives, innovations, comparative advantage

First, some of them are inferior substitutes for markets and institutions. In a developing economy, where market mechanisms and institutional arrangements are insufficient, people have to rely more on personal trust. Guiso, Sapienza and Zingales (2000) found empirically that the effect of trust on informal credit is more important and statistically significant in areas of weak legal enforcement. In the absence of medical insurance, one has to rely more on income transfers from other members of the family. In the absence of the police system, communities may have to organize their own policing and defence. If nursery schools are not available, parents must coordinate more in bringing up children than otherwise. This category is replaced by market activities, institutions, contracts and legal systems as an economy develops.

Second, some components of social capital are complements for markets and institutions. Informal exchange of views, as is done within the Economic Council, can enhance dynamic efficiency of the economy. Non-profit organizations such as associations, hospitals and schools contribute importantly to economic activities in developed economies. After the Kobe Earthquake, it was mutual aid, rather than markets or institutions, that helped people.

Third, family, friendship, sports or hobby clubs, alumni associations, etc. can be a direct foundation for well-being even if they are not producing economic benefits at all.

It goes without saying that these three are mutually related. Economic development reduces the need for the first category and sometimes leads to a deterioration of the integrity of rural villages. Then the quality of social capital can decay from the second and third perspectives as well. The borders of the three categories are affected by technology. Development of financial technology may expand the coverage of insurance. Agriculture in ancient days was more efficiently done community-wise than family-wise. Then, collaboration and even magic rituals may have been essential for production.

Even with the internationalization of economic activities, differences in human and social capital can remain, and they will assert different pressures for future development of technology. Such a difference will become an increasingly important source of comparative advantage.

The best balance between economic implications and direct benefits of human and social capital may be different across countries, depending upon culture, history and technology. This is because there is a substantial degree of institutional complementarity and path dependency in the dynamics of human and social capital.

Notes

[1] The author thanks especially Sylvain Côté and Thomas Healy for helpful comments on this symposium presentation.

[2] This is partly because income inequality was relatively small in Japan, as industrial exploitation had not started at that time.

[3] The total monthly salary for foreign scholars in 1873 was 109,000 yen. If this is multiplied by 12, it becomes slightly less than 3 percent of the government annual budget of 4.66 million yen.

[4] The argument that this aspect of social capital fosters human capital development is universal and not context-dependent.

[5] Annualized real average growth rates of 1998 Calendar Year/1990 Calendar Year and 1990 CY/1980 CY, respectively.

[6] With a technical progress of the Harrod-neutral type, the equilibrium growth rate is the sum of two rates, one of labour force growth and the other of technical progress. However, in an open economy, savings may not necessarily be invested within the country. If demand prospects are not good enough, expected rate of return on investment may be low, leading to sluggish investment. In such a case, the equilibrium rate may not be "warranted."

[7] Some argue this is because young people cannot correctly assess their intellectual capacity and, therefore, pay for education in case their intelligence is worth the investment. Such an activity is out of a "personal dream," and may be classified as non-economic.

[8] About 80 percent of Japanese people think that they belong to the middle class.

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Commentary

Robert Haveman

From the papers presented at this symposium, I have become convinced that "social capital," thought of as "social cohesion," is important for sustaining economic progress and living environments that foster well-being – even though I have great difficulty "pinning down" the concept, both definitionally and empirically. I have particular difficulty specifying the micro-linkages in the box that connects social capital to economic performance and well-being.

In spite of these difficulties, I accept for purposes of discussion the importance of social capital, and turn to the relevant questions of:

- How can social capital be increased?
- Are underlying trends that we observe and anticipate likely to increase or to decrease the formation of social capital?
- Are there policy interventions or research strategies that might foster the increase of social capital over the long run?

Edward Glaeser's paper provides an ideal framework on which to build in seeking to answer these questions. This framework forces consistency and rigor in analysing the determinants of individual choices that influence the overall level of social capital. While the "individual social skills" basis for social capital accumulation implicit in Professor Glaeser's framework is open to question, the approach that it embodies sets the standard for thinking rigorously about social capital formation. Those holding alternative views regarding the nature of social capital need to nest them within a similar rigorous framework if they are to be taken seriously.

In my comments, I will characterize Glaeser's model, and then make use of it in suggesting some answers to these questions.

The Glaeser Model of Social Capital Accumulation

Professor Glaeser has a particular view of what social capital consists, and it is important that this view be understood before exploring his model of social capital accumulation.

Let us define Social Capital, denoted by SK, to be "shared contact" among members of a community:

$$SK = \text{Shared Contact}$$

In his view, the level of Shared Contact depends on the individual social skills possessed by the members of a community – their facility and interest in interacting with their neighbours, peers and community members more generally:[1]

$$\text{Shared Contact} = f(\Sigma \text{ individual social skills})$$

The social skills possessed by an individual, S_i, depend on the characteristics of the person, some of which are inherent and others of which can be learned:

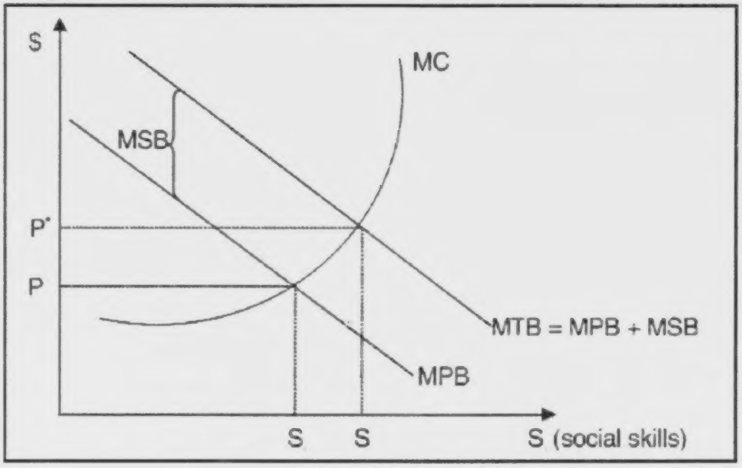
$$S_i = f(\text{Charisma, Openness, Friendliness, Persuasiveness, Oral Expressiveness, etc.})$$

Given these definitions, Figure 1 depicts the determination of the level of S_i chosen by any individual, and compares that individual optimum level with the social optimum. The individual's private demand for S is given by the Marginal Private Benefit curve, MPB, which is a standard willingness to pay curve for a good or service of value to a person.

The MPB of any person will depend on a variety of factors in

Figure 1

Marginal Private Benefit curve



Glaeser's model. Individuals obtain benefits from possessing S_i that can be immediately turned into money; for example, the greater the level of social skills, the higher the market demand for the services of the person. Hence, the level of the MPB curve depends positively on these **private market returns**. In addition, there are payoffs from having social skills that are not rewarded in the market; these are the **non-market private returns** from social skills. For example, being open and friendly may enable the person to have more influence on outcomes in the home or workplace which convey satisfaction, even though they do not pay off in increased income. Moreover, the longer the person's **time horizon**, the greater the willingness to pay for social skills; they can be used to generate market and non-market returns over a longer span of time. Similarly, holding other things constant, a person who discounts heavily any benefits from these skills that will materialize only in the distant future will have a lower marginal willingness to pay for them than a person who does not so heavily discount future effects. Hence, the level of the MPB curve will depend positively on the person's **marginal rate of time preference**, or discount rate.

This can be stated as follows:

MPB = *f* (private market returns [+];
private non-market returns [+];
time horizon [+];
rate of time preference [-])

However, in addition to these private benefits, the level of S_i chosen by any individual also carries with it "external" or spillover benefits that accrue to society more generally; call these the Marginal Social Benefit of S_i, or MSB. Because these returns are both external and non-marketed, the individual is not automatically rewarded for providing them.

MSB = *f* (external, non-market returns)

The total social willingness to pay for any amount of S_i that a person possesses is then the sum of the MPB and MSB; call it Marginal Total Benefit, MTB. It is the total willingness to pay for units of S_i.

MTB = MPB + MSB

However, securing S_i is costly, and the costs are mainly the time and other resource costs of acquiring the characteristics that compose social skills, such as openness and friendliness. If we assume that the only component of these costs is the individual's own time, then we can draw the marginal cost of acquiring additional units of social skills, which will be an upward sloping function indicating increasing marginal costs. In the diagram, the Marginal Cost of social skill acquisition is labelled MC.

MC = Time × Value of Time

With these constructs, then, the operation of Professor Glaeser's model is clear. Left to make their own choices, individuals will maximize their private well-being by choosing a level of S_i equal to S_P. The "price" that the individual pays for this level of social skills is *P*. However, the optimum level of social skills for that person, as viewed by society as a whole, is S_T, a greater amount. At the margin, society would be willing to pay a "price" of P^* for the social optimum level of the person's social skills. Left to only private choices, a less than optimum level of social skills will be the outcome. As a result, the total level of Shared Contact, or Social Capital (SK), will be less than the socially optimum level.

Given this conclusion, the issue becomes: What can be done to move the level of private choices regarding the acquisition of S_i closer to the social optimum?

In developing the implications of his model so as to provide a richer answer to this question, Professor Glaeser makes three additional assumptions that allow some important conclusions to be drawn from this framework. First, he assumes that S_i is jointly produced with schooling; the more education a person acquires, the higher the level of the person's social skills. Second, S_i is also acquired by working in jobs or living in communities that have a high level of social intensity; working in such jobs or living in such communities enhances a person's overall level of social skills. Finally, the level of social skills, S_i, that a person acquires will be limited by the ethnic/linguistic heterogeneity of the environment in which he or she lives. In effect, Professor Glaeser assumes that such diversity inhibits the acquisition of social skills.

After adding these assumptions, Professor Glaeser has a framework that describes the determinants of private social skill acquisition, and hence social capital, SK.

SK = f (time horizon [+];
discount rate [-];
opportunity cost of time [-];
vestedness in socially intense jobs or communities [+];
level of schooling [+];
racial/ethnic heterogeneity of environment [-];
other factors [?])

What Can Be Done to Increase Social Capital?

Given this model, then, one can systematically explore the factors that either contribute to or detract from the accumulation of social capital. Taking the model at its most basic level, the answer is clear: Anything that will reduce the costs of acquiring S_i, or raise the benefits to the individual of S_i (MPB), or enable the external benefits of S_i (MSB) to be captured by the individual will lead to an increase in SK.

However, this is a rather abstract answer. Given the model and the assumptions made by Professor Glaeser regarding it, one can use the framework to indicate some rather concrete factors that could lead to increases in SK; factors that themselves either reduce the costs of S_i development, or raise the benefits from holding S_i, or enable the MSB of S_i to be captured by the individual. A little thought suggests that the following changes, some of which are affected by public policy, can lead to increased accumulation of social capital, SK:

- increased levels of schooling
- increased school effectiveness
- increased emphasis on the development of social skills in school
- reduced rate of time preference (or, a lower interest rate)
- increase in available discretionary time (perhaps through reduced work time)[2]
- reduced ethnic/linguistic heterogeneity
- reduced barriers among ethnic or racial groups
- increase in community or job vestedness (e.g. home ownership)[3]
- increase in the social content of jobs and communities
- reduced market failures (e.g. information, access) in the production of S_i
- subsidized production or use of social skills
- taxed or restricted production or use of non-social (e.g. technical) skills.

This is a long and disparate list of the determinants of SK that are revealed by this conceptual framework. Some of them seem straightforward and attainable, while others seem difficult to secure. While some of these changes seem attractive in their own right, others do not. For example, the reduction in the ethnic or linguistic heterogeneity of nations or communities is clearly not a universally shared social objective.

Implications of Long-Term Trends for the Accumulation of Social Capital

One of the benefits of this framework is that it enables us to roughly assess the implications of a number of demographic, social and policy trends on the level of social capital development. In what follows, I identify a number of these trends, and attempt to characterize the probable relationship between each and the prospects for social capital accumulation.

One of the most widely recognized demographic changes affecting nearly every nation is the **aging of the population**. As the average age of the population increases relative to increases in longevity, the time horizon of the typical citizen becomes shorter, and hence less is likely to be invested in the accumulation of social skills, and hence social capital. A possible offsetting factor is that, as people retire, the level of discretionary time that they have available increases, thus reducing the cost of developing those social skills that are the constituents of social capital.

Another trend that has been observed in most OECD countries is an **increase in income inequality**, one which shows little tendency to reverse itself.[4] Unlike the aging of the population, the increase in inequality seems likely to have primarily negative effects on the accumulation of social capital. Because of sagging wage rates, there are two, potentially offsetting, effects on low human capital citizens. The reduced wage rate that they face implies a lower value of their time, hence shifting down the marginal cost of investing in social skills. Depending on the elasticity of their demand for social skills, this effect may lead to a large or small increase in the level of social skill investment that they choose. Counter to this effect is the need for low human capital people to increase their work effort to maintain above poverty incomes in the face of sagging wages. If they respond by increasing their work time, the discretionary time that they would have available is likely to be reduced by the growth in inequality. The conceptual framework suggests that this reduction in discretionary time will result in lower efforts to increase social skills; social capital accumulation is likely to suffer. Individuals at the other end of the income distribution are likely to spend their income purchasing additional leisure and privacy for themselves; both of these appear to have high income elasticities of demand. While the additional leisure could be used for investing in social skills, the apparent desire for increased privacy (e.g. second homes, exotic travel, private airplanes, private yachts) suggests little attention to the further accumulation of such skills or to increased vestedness in community. Moreover, because the growth in economic inequality has such a strong racial dimension in many OECD countries, the level of ethnic/linguistic separation is likely to be increased; again social capital accumulation is likely to suffer.

In spite of the growth in inequality, many OECD countries appear to be placing increasingly high weight on **work-oriented social measures**, such as welfare reform. In the context of Professor Glaeser's model, this trend would seem to have both positive and negative effects on social capital accumulation. While the reduced discretionary time available to poor families affected by the policy is likely to negatively affect social capital accumulation, the increase in social interaction associated with holding a job is likely to increase social skills and, hence, social capital.

Such social policy reforms tend to be accompanied by measures designed to **increase labour market flexibility**. Job and geographic mobility are accompaniments of such flexibility, as is the use of layoffs, downsizing measures, and the hiring of temporary or contingent workers. These changed labour market institutions are likely to lead to reduced vestedness in job and community, and hence less social capital development. Countering this, however, is the increased precariousness of economic status and the pressure that creates for increasing human capital, one component of which is increased social skills. Only if the latter effect dominates the former will there be increased accumulation of social capital.

For many OECD member countries, **increased immigration** has been experienced or is anticipated. Because none of these nations is a natural "melting pot," the result is likely to be increased ethnic/linguistic heterogeneity and separation. This group isolation, or antagonism, hardly promotes incentives for the creation of social skills and voluntary social interactions. Again, social capital accumulation is not likely to be enhanced.

The trend toward the **increased prevalence of single-parent families**, and smaller completed family sizes, suggests less interaction by children with either their parents or their siblings. Because the development of social skills is enhanced by such interactions, the reduction in the opportunity for intra-family interactions would seem to inhibit the development of social skills and hence social capital.

Countering this is a strong trend toward **increased use of organized early child care** outside the home, much of which is "enriched." Clearly, among quality day-care providers, the promotion of social interaction (e.g. participation and cooperation) and the development of social skills are high on the list of program objectives. If these institutions are successful in achieving these goals, social capital will be enhanced.

Two additional trends seem worth mentioning – the **decrease in organized religion** and the rapid **increase in time spent in computer-oriented activities** (e.g. accessing the world-wide web, or home-based work). Historically, religious organizations have been important centres of social interaction, and attending services has a strong social and interactive component. The disinterest in religion that is observed in many societies suggests reduced accumulation of social skills and diminished social capital through this channel. Similarly, the trend toward increased reliance on the computer and the Web, and the growth in home-based work for those whose jobs rely on the computer, suggests less interaction and less need to develop social skills. Working on one's computer is a very private activity, eroding the need for accumulating social skills. Social capital accumulation would again seem to suffer.

These, then, are a few of the important trends that are now in evidence in most OECD member countries. The bulk of them suggest erosion in the incentives for accumulating social skills and promoting social interactions. On balance, I judge that these trends imply a reduced social capital accumulation.

A Few Implications

If one takes seriously the concept of social capital that is implicit in Professor Glaeser's model, and the economic model itself, are there implications for social science research and for policy?

A few would seem worth noting. First, while this conceptual framework suggests a positive linkage between the accumulation of S_i and MSB, the precise nature of this linkage seems not at all well understood. Research efforts would serve us well if they could expose these relationships. For example, while enhanced social skills and the propensity to use them are presumed to lead to the accumulation of social capital, sustained economic growth and enhanced social well-being, that is not necessarily the case. While many voluntary social organizations make a positive social contribution, surely not all do; Nazi youth groups in the 1930s and militia organizations today are voluntary and social arrangements!

Second, in the context of Professor Glaeser's framework individual tastes and preferences are taken as given and fixed. Yet, it is not at all clear to me that in this social dimension that is the case. Can policy measures, admonitions by national leaders or efforts by non-governmental organizations directed at encouraging the development of social skills or participation in voluntary organizations with positive social benefits be effective in changing tastes? Is there a role for leaders and policies in increasing social capital accumulation and, if so, what is it? Perhaps that is the most important question, and it remains unanswered.

Notes

[1] This step in the framework deserves close scrutiny. Do individual social skills translate into "shared contact," and if so, how? Does increased shared contact necessarily mean increased social capital? Does not the answer to this depend on the precise definition of social capital?

[2] An increase in available discretionary time would decrease the costs of time spent in acquiring S_i.

[3] An increase in involvement in socially intense jobs or communities will increase the payout period for S_i; it will expand the time horizon over which social skills convey private benefits.

[4] It is at this point that Professor Osberg's paper relates to the issue of social capital formation. His powerful study reminds us that the economic well-being of a society consists of more than income or production, but that other factors, some with links to the social capital concept, are also important determinants of a nation's social health and potential for sustained growth. While one can quibble with his specific non-income components of well-being, his measures of them, and his aggregation technique, they would only be quibbles. A clear next step for his work is to explore the inequality in the distribution of a more full-bodied measure of economic well-being, and the trend in the inequality of well-being.

Tom Schuller

Beginning with Jo Ritzen's paper, I'm not sure if we can take up his challenge to social capital and his desire to replace it by social cohesion. One advantage of using social capital over social cohesion is that, to me at least, the former implies a greater sense of agency, of activity, even of commitment. There is an issue about activity and engagement that I don't think social cohesion represents to people.

Second, a very small point but of wider significance. Ritzen cited Ireland as an example, but did not mention two things in relation to it. One is the very high level of EU subsidy that is generally regarded as one of the factors that enabled Ireland to achieve its growth and investment results. The second, which is the more relevant one here, is that human capital development in Ireland started actually after the upturn in economic growth. Thus, there is often an issue about the sequencing of these things that's interesting to speculate on. I wish it would be the other way around; it's more comforting for people who wish to see increases in investment in human capital.

There are two larger points in relation to Ritzen's paper. First, I was very taken by what he said about the management of crises. He was talking about Koreans and their capacity to handle crises at a national level. But I think that's an issue that can be transposed to all sorts of other levels, down to the individual, where human capital has a strong role to play in enhancing the capacity of any social unit to manage crises, to anticipate them, to handle them and to know where to go for help to handle them. So I found that a very fruitful line of thinking; people can interpret crises in lots of different ways, but I think that management of turning points in crises is something that has a lot of mileage in it. His last point, which I thoroughly endorse, is the reference to the quality of education and not only to levels of attainment and the key role between that and social understanding.

Moving on to Lars Osberg and Andrew Sharpe's paper, I welcome the framework and the extension of the breadth of our thinking about well-being. I am slightly puzzled why they retained "economic" in their heading. It seems to me they were talking about well-being in general, and I thoroughly approve the breadth in the way in which they think about it. I noticed – and this is retaining a rather specific focus on the human capital side – that they acknowledged the crudity of their human capital measures, and I wonder whether they feel there is any scope for refining those and how that would influence the outcomes of the model. But I did find helpful the fact that they used sensitivity analysis in their paper. And I think, given the many remarks that have been made about the weakness of data and given the developmental stage we are in with models, for us to play around with different outcomes and to test those against our own understanding is a very helpful approach.

I thought Rod Dobell's spectrum of involvement, engagement and commitment had actually quite a lot to offer in relation to some of the core notions of social capital – the sharing of values. Let me just explore that very briefly. Can we operationalize social capital, not specifically or not only in terms of a single extent to which people share values in attempting to achieve – through reciprocity – mutual goals, but through a whole spectrum? At one end of that spectrum could be total congruence in values, total agreements of strong communitarian forms; at the other, total conflict of values, clashes, etc. It is difficult to see where this would fit in with social capital, but as we move between the two ends of the spectrum, there will be other points on this spectrum where there may be divergence of values but at least a mutual acknowledgment of the legitimacy of each other's values. That seems to me very important because it enables one not to operate with unrealistic assumptions about total consensus – as I think maybe some of Dobell's arguments tend to, and that is what we are working toward – but allows for a plausible degree of divergence and dissension while recognizing that there is a coherent framework there.

I enjoyed Ed Glaeser's presentation and his forthright stress on the individual dimension. I agree with the stress that had played on the difficulty of aggregation, and I also thought he made a strong point, in the paper at least, about the need to look at depreciation of social capital as a pressing research topic. I disagree with him fundamentally on one aspect of his approach and agree with him on one of his conclusions. The disagreement is on the individualized approach to decision making in relation to social capital. To give a very specific example, it just seems to me completely unrealistic to conceive of older individuals choosing to run down their social capital in the way Glaeser modelled it where civic engagement is concerned. There are other factors that stop older people from becoming civicly engaged, like not being able to leave their house. These are fairly practical reasons, rather than them saying, "right, well, sod the world, you know, I'm not long for it, so forget the grandchildren, forget the children, and we'll just wrap up affairs so that I've tailed down to point zero." I'm sorry, that's a caricature, I know, but there are other environmental factors that impinge on what people are doing. However, I'm sorry he did not have the time to explore some of those details relating to the physical environment; I think that is a very fruitful line to explore. And his overall conclusion of education as the key link to focus on, I endorse thoroughly.

Regarding Takashi Omori's paper, I thought it was a fascinating instance of a case study of a particular culture and country that had a lot to tell us. He identifies a very interesting set of relationships, including trust relationships between businesses and customers and the way in which that operates. But the particular value, I think, of this paper, that I'm sure we all acknowledge, is the way it traced the trajectory of the intersection between economic change and development, and social capital, and the way in which forms of social capital that may have been valuable at certain points in that trajectory turned from being a plus to a minus or were not adequately developing along with the economic line. I thought that was a really informative part.

I have four overall points to make. First is the need to trace different trajectories. It really recapitulates what I have just said in relation to Takashi Omori's paper, different trajectories of social capital, depreciation as well as accretion, decline as well as growth, as well as relating those trajectories to the different trajectories of human capital appreciation or depreciation and looking at the relationship between those different parts.

Second, the need for multidimensionality. We would all probably in principle endorse that, but looking at things from different angles, using different models, using different data sources and applying these at different levels. The problem, of course, is that this generates huge permutations, but there seems to be great value in testing these against each other, even if we cannot do this as neatly as Bob Putnam did in his paper. In reference to what I have said before, partly to have reality checks, but also to have rigor checks, it is important to acknowledge other people's approaches to things, even if we do not actually share altogether the validity of their approaches.

Third is to look – I had the same or similar point for Bob Haveman – at work and other environments. Looking at the nature of working environments and the way in which that encourages or discourages the development of both human capital and social capital is something that the OECD did many years ago, and there is a lot of other work in Scandinavia from the 1970s in particular. Clearly, if you are working on a Tayloristic form of production with noise levels so loud there is no hope of communicating with your colleagues, the chances of such a work environment directly fostering large levels of social capital or human capital are fairly small. Although, since I produced that example, of course one thing Taylorism did do is produce very high levels of solidarity among large chunks of blue-collar workers. So there are also complexities there, but I think it is important to look more carefully both at work environments and consumption environments, like shopping malls, the types of areas that dominate the city environments or for that matter the rural environments in which people live, and how those physically shape, develop or inhibit the growth of human and social capital.

And lastly, I would like to endorse the need to look more closely at education as a key factor in social capital, but to look particularly at the quality of learning. It has to do with social understanding. I think Jo Ritzen referred to this. It has to do with growth of empathy - what does education do to enable people to understand each other's viewpoints more clearly. And also, this I think is Rod Dobell's point about social learning. Education is in itself a social activity; the very undertaking of education, the very act of accumulating human capital in itself may help to accumulate social capital.

Part 5

Rapporteur's Summary and Roundtable

18

The Contribution of Human and Social Capital to Sustained Economic Growth

Symposium Report by John F. Helliwell

1. Introduction

From an HRDC perspective, Avrim Lazar posed three questions:

- Are we investing too much or too little in social capital?
- Can social capital be eroded?
- With what consequences?

He also remarked that there is a policy climate in which evidence has become more important, and ideology less important, in the evaluation of policies and their consequences.

Thorvald Moe set four questions from the OECD's perspective:

- How much more research is required before policy implications start to appear?
- Is there a consensus on definitions?
- If there are policy implications, what are they?
  - What should the OECD be doing next in this area, in terms of:
  - conceptual work
  - collection of data
  - policy analysis

2. The Conceptual Framework

The key questions for the second session were:

- How should the concepts of human and social capital be defined and related to each other? Should a distinction be made between social capital and social capabilities?
- How can human and social capital be best measured?
- Are existing theoretical models for explaining economic growth and development adequate in terms of the role they accord to knowledge, human capital and social capital?

3. Keynote: Robert Barro, "Education and Economic Growth"

Robert Barro provided an update on his cross-country panel growth studies of the effects of human capital on growth. His latest finding is that test scores do better than his earlier measures of years of schooling. The model is still a growth framework of conditional convergence. This framework implies that poor countries grow faster than rich ones (initial income takes a negative coefficient in growth regressions), if both have the same levels of human capital and other growth determinants. The estimates of the effects of human capital include not only the effects of human capital in increasing the equilibrium level of income, but also its effect on the rate at which countries can import good ideas from abroad, and hence their rate of convergence toward the per capita income levels in the leading countries. Using education measured by years of secondary school attainment, he finds significant effects within the global sample, of a magnitude that matches many studies of rates of return based on micro-economic data, but finds no effect within a more narrowly defined OECD sample. However, he did note that his educational attainment data for many OECD countries are substantially different from the published OECD data for the same countries. Using student test scores, which requires the use of a sample of countries only half as large as the initial global sample, he finds significant growth effects for the science score. If the test scores go up by one standard deviation, the growth rate rises by 1 percent per year, before taking into account the convergence effects. One problem with these results is that the test scores are taken toward the end of the growth period. This particular result seems to hold even within a sample that includes only rich countries. Although the science results appear to be more important than either mathematics or reading scores, the country samples are different for the various measures, and different combinations of test scores also produce varying results.

In summary, the current results on the effects of human capital on growth suggest that quality is more important than quantity, and hence that measures of outcomes might prove more fruitful than measures of years of education or resources employed in education. He continues to support the use of multi-country datasets to provide a wider range of outcomes, accepting the possible risk of heterogeneities that might confound the measurement of the effects of education.

4. Gunnar Eliasson, "The Role of Knowledge in Economic Growth"

Gunnar Eliasson started his presentation with a description of the range of changes made in Sweden during the transition to the industrial revolution. During one 50-year period spanning the start of the 20th century, all of the companies that are now the driving forces of Swedish industry were started. In analysing this period, he emphasized that in an information-based economy, with agents learning by doing, each business decision is best regarded as experimental in nature. As these experiments proceed, the losers are selected out by failure, and the winners get to keep experimenting. Growth is faster where the selection process is more efficient, avoiding keeping the losers too long, or failing to support the winners through initial problem periods.

For efficient development in a knowledge-based industry, he emphasizes the need for six key types of actors:

1. competent and active customers
2. innovators capable of integrating the findings and exploiting the new results of R&D
3. entrepreneurs capable of recognizing opportunities
4. venture capitalists to finance them
5. exit markets to facilitate the recycling of equipment from past losers to new winners
6. industrialists capable of taking new ideas from the experimental stage into industrial-scale production.

Tacit knowledge embodied in organizational and work practices plays an important role in the transformation of competence into economic success.

Eliasson argues that in contemporary Sweden the gaps may relate to inadequate supply of entrepreneurship and venture capitalists. He uses case studies to show that getting all of the components together can make significant contributions to growth at the firm level and at the level of the national economy.

A key point of the paper and presentation is the need to get inside the black box to understand the nature of the markets and firms that govern the pace and efficiency with which knowledge is developed and applied. Behind the aggregates lie very particular institutions that determine how and whether education and knowledge creation have a social and economic payoff.

5. Michael Woolcock, "The Place of Social Capital in Understanding Social and Economic Outcomes"

Michael Woolcock's paper and presentation start with discussion of the historical origins of the use of social capital, followed by a survey of the most important literature and finally an approach to policy implications. The intellectual underpinnings of social capital lie in the roots of sociology, and Woolcock, a sociologist, encourages the use of a relatively narrow definition that is fully consistent with earlier work in sociology. For him, social capital is "norms and networks that facilitate collective action." He agrees trust and institutions are important, but would like them to be considered separately. This does exclude some interesting work, but is able to include many important studies of networks. Thus defined, social capital may have negative as well as positive effects. He makes a distinction between what social capital is and what it does; where it comes from rather than what it does. He then distinguishes bonding and bridging social capital, with the family being used by him as an example of bonding, and the rolodex file of addresses as an example of bridging. He adds a third type, denoted "linking" social capital, which provides access to those at different levels and further afield.

Turning to evidence, he started with urban studies showing that crime is less and employment prospects better where measures of social density are greater, after allowing for other factors. Education is a classic case: schools that are community resources, and in which parents are involved, produce not only better outcomes for the students, but also for the communities served by the schools. In public health, higher levels of social capital are correlated with lower mortality from heart disease and infant mortality, lower rates of murder and suicide, and higher levels of self-reported health status. In economic development, innovations diffuse much faster in communities with rich stocks of bridging social capital. Social ties help to support the individual losers, and hence to manage risk more efficiently. Social networks determine where people move and how they succeed when they get there. Communities that are able to work together are also able to coordinate their community resources and make more successful approaches to outside authorities whose support is crucial to their ventures.

On the policy side, he suggests seven areas for possible policy improvement:

1. Make it easier for people to own homes.
2. Invest in more and better public spaces, events, transport and education.
3. Urban planning and architecture should lower commute times, heighten interaction among neighbours, and integrate vocational and residential activities.
4. Have tax policies that lower inequality, and encourage the formation of bridging and linking networks to disseminate what works best in improving living conditions.
5. Improve accountability.
6. Provide better safety nets (pensions and health insurance) and springboards (adult education) for the poor.
7. Require, recognize and reward leadership that listens to and interacts with those at "the bottom." He notes also the value of immersion programs for executives, and recommends more attention to team building.

In summary, have rigor in definitions, respect for the results of research, and apply the spirit of social capital in the choice of policy directions. The ideas and ideals of social capital can be important not only in understanding the issues of development, but in fostering better understanding among different agents and agencies of expertise. If the concept is instrumental in increasing cross-fertilization among disciplines and methodologies, it will have more than earned its keep.

6. Tom Schuller, "The Complementary Roles of Human and Social Capital"

The central theme of Tom Schuller's presentation was to underline the complementary nature of human and social capital. Speaking of education as both the seed and the flower of economic and social progress, he argued that the same could equally well be said of social capital. Social capital can be seen as an enabler of the productive use of human and physical capital, with negative examples also available. In the other direction, there are important links from education to social capital, partly by teaching the skills needed for responsible citizenship, but more importantly as a means of increasing self-esteem, so necessary to support personal and social capital. He wonders if the human capital metaphor may be running out of steam, requiring a new twist to better establish links between education and economic and social performance.

Turning to the empirical work, he sees a tradeoff between extending the range of what is and can be measured and increasing the precision of use of what is already being measured. He emphasized two areas in particular where existing measures proved to be inadequate:

1. informal learning
2. quality of relations in which learning takes place

Although informal learning is agreed to be critically important, the measures of education still depend heavily on formal education. There is also an important link between learning and social capital, as both occupational and social skills are learned on the job at least as much as in school. Both values and competence are only truly learned when they are applied. He also stressed the importance of educational quality (consistent with Barro's results), as well as the institutional and social settings in which learning takes place – the family, school and workplace. Finally, he advocates more use of longitudinal studies.

2. Commentary by Jo Ritzen

As first discussant, Jo Ritzen approved the choice of topics, including especially the juxtaposition of human and social capital. He emphasized that education ministers recognize and value the informal social consequences of education in helping people to function well together as a society. He appreciates also the use of data and analysis applicable to both developing and developed countries, in the expectation that a wider range of experience and institutions should provide a better means of identifying structures.

How are things going with human capital? The marginal product of human capital research has been declining. What remains to be done, still, is to develop measures of educational achievement that are rather more refined than years spent in school.

Social capital, by contrast, is still moving fast out of the gate. He noted Robert Barro's inclusion of the rule of law along with human capital in the determination of growth. He noted other development studies have shown significant effects from the rule of law and other less tangible aspects of social capital. Ritzen argues that it is necessary to make clearer distinction between public and private expenditures, since the former are almost entirely wages. Moreover, many public sector workers are also the most highly educated. Achievement test scores are worthy of attention, but may be effectively an East Asia dummy variable. Within Europe, Sweden and the Netherlands have very high science scores but very low growth rates.

Ritzen applauds Eliasson's emphasis on the importance of spelling out the industrial structure more fully before analysing the linkage between human capital and growth. He thinks Eliasson may be overemphasizing the role of tacit knowledge.

Turning to Woolcock, he thinks that too strong a separation is made between social capital and its consequences. Ritzen would like the term to refer mainly to those norms and networks that actually can be interpreted as assets.

Turning to Tom Schuller, he noted the importance of a moral dimension in discussions of social capital and social cohesion. He pointed to the emerging debates among educational policy makers in many countries on the meaning of values and the possible role of government, and of Ministries of Education in particular, in promoting common values within agreed parameters. The issue relates to a possible conflict between freedom of choice and the importance of common values. He also thinks that Schuller, being himself directly involved in continuing education, may have overstated the case for informal education. He supported more research and analysis into the length of initial education.

2. Commentary by Tom Alexander

Tom Alexander noted brain studies that show the enormous plasticity of the brain at early ages, and its continuing ability to maintain learning capacity into old age. Why is the OECD taking an interest in social and human capital? The OECD had an initiating role as well as a responsive one. Dealing first with human capital, he sees some growing concern about the quality of measurements. Dealing with these issues may provide some model for social capital. In 1998, the OECD emphasized a narrow definition of human capital, in order to buttress the case for educational investment. He agrees with Barro that the attainment data are worthy of more effort; the OECD is this year running an achievement test for 15 year-olds, with a three-year survey cycle focussing on a particular domain of proficiency every three years. It is hoped that the resulting data will provide a better basis for assessments of the role of human capital. There is now a wider OECD survey of adult literacy for 20 countries (the International Adult Literacy Survey) nearing the reporting stage. Work is also going ahead to build multifaceted measures of competence. He agrees that Tom Schuller's point is important – that there is a temptation to use imperfect data rather than develop better ones.

Turning to social capital, Alexander admired Woolcock's survey, and the clarity of his definitions, but wanted more emphasis on outcomes and possible policy implications.

He agreed with Tom Schuller's emphasis on lifelong learning, but noted the many difficulties in assuring that it is available when needed, and ensuring the ease of transfer into and out of the educational streams when the advantages of doing so are greatest.

Tom Alexander appreciated Gunnar Eliasson's emphasis on competence blocks, but is more confident than Eliasson that these competences can be measured.

2. General Discussion

In discussion, Lars Osberg wondered about the linkages among the different parts of the OECD dealing with these issues. For example, is mobility as good as indicated by the OECD's advocacy of labour market flexibility, or might it threaten social capital and cohesiveness? Thorvald Moe noted that the OECD serves all parts of national governments, and so its work to some extent reflects differences that arise within national governments. That said, he noted convergence within the OECD and in national governments, with emphasis, for example, on employment-consistent social safety nets. Tom Alexander agreed, and sees a trend toward more horizontally managed and consistent treatment of economic and social policy issues. Jo Ritzen said that the same issue arises at the World Bank. The Washington Consensus was in vogue between 1980 and 1985, favouring privatization and deregulation. This led to throwing out old systems, and there is now more attention to what needs to be done to ensure that capacity for change is set in place before the system is shaken by large policy changes. The current policy focus is to combine policy reform with social cohesion. Robert Barro argued that there is a trade-off between the welfare state and economic freedom, with the UK doing more to increase mobility, and the other main European countries tending to do more to keep the welfare state in place. His opinion was that the UK was right and the rest of Europe was wrong. He also complained that Michael Woolcock's policy recommendations were indeed, as suggested by Lars Osberg, a revival of the traditional welfare state, which Barro regarded as being outmoded.

Bob Putnam noted, in response to Barro, that there is clear distinction to be drawn between an interest in the concept of social capital and whether the observer professes social democratic values.

Barro was asked what he thinks about the literature that suggests a negative relation between income inequality and growth. He replied that, overall, he regarded the evidence as weak, being negative in global samples but not within the OECD, where it may be positive.

Barbara Wolfe emphasized the research showing the importance of the early childhood years, and the lack of much by way of research into the structure and educational content of the preschool years. She noted that early childhood education is perhaps the most stratified of all, with, in the US, some head start programs at one end and private preschool programs at the other.

Mario Cervantes agreed with Eliasson that the study of firms was important in studying the transfers from human capital to growth. Firms that tap into networks of public research, etc., are found to perform better.

Sylvain Côté of the OECD picked up Woolcock's emphasis on the importance of the right mix among different aspects of social capital. Given the range of regional differences within countries, perhaps the country is too large a unit for analysis.

Edward Glaeser replied to Robert Barro that the network effects of mobility were externalities. Since social capital is higher when people have deeper roots in their communities, mobility that is privately valuable may have negative effects on social capital at the community level. He noted different types of distribution, from taxes to robbery, and sketched some links between them. He also noted that schooling was likely to be the big item in the linkage between social capital and growth.

Robert Haveman queried Robert Barro's preference for test scores. The depth of test taking, and the range of countries implies a great selection bias for these data. Some bias-producing factors might include urbanization, equality of distribution of education, etc. Is the score after all an East Asia dummy? Barro says that the years of attainment may be even less accurate, but recognized the selection bias. He tries in this context to include factors of the sort described by Haveman. For example, an East Asia variable was not significant, nor was the Freedom House data on democracy.

Eliasson replied to Ritzen that a qualitative description of competence removes the necessity for a distinction between formal and tacit knowledge. When change is rapid, it spills over into the lives of ordinary people. Social capital, social safety nets, and education all contribute to flexibility in the face of change. He argues for more competition and product development in education, and perhaps for the provision of social insurance. The institution that is responsible for the current system, the government, is supposed to reform it. Is this the best model?

Tom Healy noted that one possible definition for social capital would include its positive effects, but was more drawn to a tighter definition of the sort advocated by Woolcock. However, he wondered about the exclusion of trust from the definition and its classification as an outcome of social capital. He had thought of social capital as including trust as a norm facilitating collective action as well as social engagement. Given the highly specific and culturally bound nature of social capital in various settings and contexts, some people may accept that social capital, while being important, is hardly measurable at a macro level. He had previously argued that human and social capital were really the same thing, with the norms and networks being manifestations of higher (or more collective) levels of human capital. However, he now accepts that human and social capital need to be clearly separated although they complement and produce each other. The symposium needs to focus more closely on the linkages between social capital and lifelong learning.

Takashi Omori asked how best to identify the effects of social capital. There is at least a choice to be made between micro and macro approaches; basing this partly on the frequency with which accounting changes alter the measurement of Gross Domestic Product (GDP). Is the international variance of social capital greater or less than internal variance? If the country effects are important, and are related to social capital indicators, then a macro conclusion may be valid. The same could be done at the regional level. He argues that technologies are equally available in all countries.

Richard Roy asked Michael Woolcock if there is a substitution of public systems for the networks otherwise provided by private networks.

In summary, Tom Schuller argued against the use of dichotomies. There is not a contrast to be drawn between the welfare state and the market, since some aspects of the welfare state improve markets and growth and others do not. The ability to manage change is not just a re-stating of the old flexibility debate. There is a real question of how much is learned inside and how much outside school. What may be needed is a methodological deflator to deflate (or inflate) the measures of formal education to account for the informal acquisition of knowledge.

Woolcock confirmed that bonding was indeed among those who are alike, and bridging is among those who are different. Linking is an add-on. Secondly, social capital should not be brought into the debates about the proper extent of the market. He agrees that policy prescriptions should be based on the data. He argues that social divisions can be destructive to growth, and social capital may be an important part of the story. The social capital perspective is as much about how we are doing things as about what is done. You can ignore the interests of affected but voiceless parties, or include them. The move from blueprints to frameworks implies more concern with getting diverse views together to work out approaches and solutions. The policy prescriptions he advocated should not be seen as representing a particular political perspective, and should be assessed on the basis of their congruence or not with whatever evidence can be brought to bear.

Gunnar Eliasson agreed that even if measurement is impossible, further attempts are to be encouraged. If this includes the micro level and the firm level, so much the better. He wants to continue to define social capital in terms of its functions. A conceptual framework is needed. Finally, in response to the demands from policy makers, economists are always able to produce policy advice whether or not it is correct. The policy makers should search both for a better research base and to find a wide range of policy viewpoints. This suggests the need for a slow approach to policy implications.

Barro noted that when he started his growth studies, he was told by the World Bank that it was interested only in developing countries. If it was wrong, is it not also right for the OECD countries to pay more attention to the experiences of the developing countries? As for micro versus macro studies, he argued that the central issues of inference arise at both levels. To the extent that policy makers are concerned with growth at the aggregate level, there seems to be no way of avoiding the inclusion of social capital measures into aggregate growth equations. He approves research of the sort that Steve Knack has done on the importance of the rule of law. Finally, he noted that many of the achievement scores at the adult level, such as the various adult literacy surveys, have the potential for filling the gaps between formal and informal education.

3. Empirical Evidence

The key questions for the third session were:

- What is the evidence for the impact of investment in human and social capital on recent economic growth patterns across OECD countries? Are these likely to be more significant determinants of growth patterns across non-OECD countries?

- Is it possible to account for the returns to different types/levels of human and social capital?
- Is there empirical evidence that investment in human and social capital generates "non-market benefits?" If there is, how can such non-market benefits be integrated into a broader measure of the total social impact of such investments?
- Is there evidence for under-investment in human and social capital from a socially optimal point of view (arising out of externalities and divergences between social and private returns)?

7. Keynote: Robert Putnam, "Social Capital – Measurement and Consequences"

Networks and norms have high value for those directly involved, and generally have public or external returns. Just as there are diverse forms of physical capital, so are there diverse and non-interchangeable forms of social capital. Issues of aggregation apply to both. In the absence of coherent and valid aggregations, or to aid in the search for them, a high priority for research should be detailed investigation of the nature and consequences of the diverse types of social capital. Do not scorn the importance of a nodding acquaintance, as they have been shown to be materially more likely to aid each other if stricken by a heart attack. Bob Putnam accepts that some forms of social capital, as with physical capital, can have negative consequences.

On the basis of a broad range of evidence he has compiled for his new book, Putnam has concluded that there has been a continual decline in association memberships since 1960, following an even longer and larger rise over the previous 60 years, punctuated by a sharp decline during the 1930's Depression. Measures of informal social capital have usually been harder to obtain, since records are not routinely kept. However, recent access to the DDB Needham survey dataset has permitted the documentation of a parallel decline for a broad range of informal measures of social activities. Social trust, which is a close consequence and good proxy for measures of connectedness, shows a similar decline. Social connectedness is a good predictor of philanthropic and altruistic behaviour. The fraction of income that Americans give to charity also peaked in 1960 with a steady decline thereafter.

Social capital tends to be a substitute for other forms of contract enforcement. In 1900, there were 41 lawyers per 100 000 members of the US population, 39 in 1970, and over 70 in the 1990s. This is consistent with the idea that law and hence lawyers are a substitute for trust, which in turn is derived from the strength of interpersonal networks.

Does this decline matter? To answer this question, Bob Putnam turned to interstate differences in social capital. Social capital is highest in the North Central region centred on Minneapolis-St. Paul, with Baton Rouge at the centre of the low. These interstate differences in social capital are highly positively correlated with educational performance and child welfare, and negatively related to tax evasion, crimes of many types, and mortality.

He emphasized that the relationships linking social capital and other outcomes have been conditioned by the inclusion of many confounding effects, and the causal arrows can sometimes run both ways, but the results to date are so strong and pervasive as to demand further research.

8. Walter McMahon, "The Impact of Human Capital on Non-Market Outcomes and Feedbacks on Economic Development"

Walter McMahon presented his analysis based on an interactive model of non-market and market outcomes of education. The outcomes include economic growth, population health and growth, democratization, political stability, poverty and inequality, the environment and crime. Although learning on the job is important, the ability to acquire skills and knowledge informally depends a good deal on education acquired formally. He uses gross enrolment rates at various levels of education. His data include 78 countries. By way of example, he went through his equations for infant mortality and life expectancy. The Freedom House democracy index is modelled as a rising function of income, with an added contribution from education at the secondary level. To illustrate the interactions between education and the selected set of market and non-market outcomes, he presented results from simulation of the full set of equations, making a distinction between the direct and indirect effects where the latter represent the "feedback" effects of various non-market outcomes of education on economic growth. He argues that the indirect effects are externalities. He argues that more than half of the total effects of education are due to induced indirect effects. In his framework, increases in educational investment are followed by continued improvements in the levels and rates of growth of GDP per capita.

9. Stephen Knack, "Trust, Associational Life and Economic Performance"

The focus on trust as a key dimension of social capital is linked to the importance of the quality of institutions and governance of societies. Steve Knack's research makes extensive use of the World Values Survey (WVS) data using country averages. The key measure he uses is interpersonal trust, as measured by answers to the oft-used question, "Generally speaking, would you say that most people can be trusted, or that you can't be too careful in dealing with people?" His research deals with the consequences rather than the causes of international differences in the proportion of respondents. To provide some confidence that linguistic differences are not causing international differences in responses, Knack finds that the survey measures are correlated highly with the probability of a lost wallet being returned after being found by a stranger. The cross-country variations in trust were also correlated with survey measures of externally formed estimates of trustworthiness. Turning to his growth equation results, he finds significant support for the trust variable for the full sample of WVS countries, but not for the OECD countries taken as a separate sample. In investment equations, the positive effects of trust on investment are similar for OECD and non-OECD samples.

10. Serge Coulombe, "The Contribution of Human Capital and Urbanization to Canadian Economic Growth"

Canadian regional disparities combine with good data to motivate the use of interprovincial data to study comparative growth, including the effects of human capital and urbanization. Coulombe argues that growth follows a conditional convergence model based on differences in urbanization and one-time shocks for Alberta and Quebec. He finds somewhat similar convergence of human capital, as measured by the percentage of males holding at least one university degree. Adding human capital to the interprovincial equation produces an insignificant positive coefficient. The failure to find a significant role for enrolment in the interprovincial growth equation matches the Barro failure to find such an effect among the OECD countries.

11. Barbara Wolfe and Robert Haveman, "Accounting for the Social and Non-Market Benefits of Education"

The Wolfe and Haveman paper assesses the non-market benefits of schooling, including the increased quality and amount of education of one's children, own and family health status, the efficiency of consumer (and other life-style) choices, charitable giving, voting and crime. How is it possible to quantify the extent of possible external effects of education, so as to justify or not the extent of public expenditures on education? Almost every study shows that parental education has a statistically significant positive effect on the educational success of their children, after accounting for many other control variables. Some studies also look for possible effects on these same outcomes from certain measures of neighbourhood social capital. In the studies surveyed, the results are mixed. Finally, the paper attempts an evaluation of the non-market outcomes of education. "Non-market" effects such as health are estimated while controlling for other factors which influence health (e.g. health or social background). The monetary estimates of such "non-market" effects are made by calculating the cost of "purchasing" the same effects by alternative means to increased education. Their overall estimate is that in the aggregate the non-market outcomes are worth as much as the market outcomes, so that the total return from education is approximately twice as large as the market return.

12. Doug Willms, "Three Hypotheses About Community Effects"

Willms presented theory and evidence relating to his three main hypotheses:

1. *Hypothesis of community differences:* Communities differ in their social outcomes, even after account is taken of the socio-economic status of the individuals.
2. *Hypothesis of converging gradients:* Social outcomes improve with socio-economic status. The slope of this gradient differs across communities, with the gradients converging at higher levels of socio-economic status. Thus, successful communities are those which have been successful in improving the lot of their least advantaged citizens.
3. *Hypothesis of double jeopardy:* People from less advantaged backgrounds who live in less advantaged communities are especially vulnerable. Thus, communities with high levels of social capital achieve higher average social outcomes and also greater equality of outcomes.

In support of the first hypothesis, the author shows that interprovincial differences in mathematics scores start as early as Grade 2. By Grade 4, the Quebec scores are well above the average, and the Ontario results well below, with these differences persistent until the end of school. The paper goes on to document the author's hypothesis of converging gradients, showing that there is much less interprovincial or interstate difference in test scores for parents who themselves have high levels of education. The slope of the gradient by which the child's score is linked to parents' education is thus flatter in the provinces or states with higher average test scores. Among countries, Sweden has a high and flat gradient, and England a lower and steeper one, mirroring Willms' results for provinces and states. He also notes the importance of getting geography more clearly into the models and estimates. In this way it would be possible to analyse the data on a finer scale, and to see more directly the effects of provincial and national borders. In common with other speakers, he emphasized the key importance of planning longitudinal surveys to enhance the knowledge base over time.

Willms stressed the importance of disciplinary climate, parental involvement and high expectations in raising school and literacy standards. Furthermore, family and community effects are important in raising the literacy of disadvantaged groups. The response of societies and communities to disadvantage is an important determinant of how well they perform in terms of overall literacy. Inter-country and inter-community differences in literacy and skills are related to differences in inequality, supporting the hypothesis of double jeopardy. Differences of literacy and skills among more socially advantaged groups are less across countries and regions than the corresponding differences for less advantaged groups.

3. Commentary by Gunnar Eliasson

He proposes to comment on individual papers and to look for overarching themes. Some of the data and models are micro, and the rest are macro. Aggregation inherently washes away much of the interesting details and micro-level effects such as organizational and entrepreneurial dynamics are lost. The macro models of McMahon and Coulombe both have convergence effects. What would happen if Silicon Valley were added as a separate region? Looking at all of the papers showing large market and non-market returns to education, he is doubtful about jumping too quickly to the conclusion that more formal education would still be a high return public investment, even taking into account the Wolfe and Haveman result that formal education increases the ability to acquire informal education.

Referring to Willms' paper, with its emphasis on distribution, he wondered if an alternative measure of growth should perhaps be used. He also wondered if there were returns to shifting emphasis from higher education to primary, and from both to the family. He liked the Steve Knack paper, even though it fell into the less-favoured macro category.

3. Commentary by Richard Harris

Harris is not yet convinced that social capital is a silver bullet, and is awaiting a fuller theoretical and empirical analysis. The attendant spur to interdisciplinary research is much to be welcomed. He saw the Putnam results as possibly running contrary to the international studies, with the risk that measurement may have gotten ahead of theory. In the absence of an underlying theory, policy conclusions would be premature.

Starting with McMahon's paper, he was struck by the long horizons implicit in the equations and the model. At face value, the links from education through non-market outcomes through to economic growth were strikingly important.

Harris is unsure of whether the trust variable captures what others mean by social capital, but likes the Knack result in any case. With respect to the Coulombe paper, Harris wonders if the convergence in education levels may be attributable to federal funding of higher education, and not to any economic growth model. He also thinks that there is room for terms-of-trade effects in provinces other than Alberta and Quebec. On the Wolfe and Haveman method of imputing a social effect, he sees problems in identifying the relation used to measure the non-market effects. Finally, with respect to the Willms' paper, he wants to know more about reasons for the hypothesis and evidence on converging gradients.

3. General Discussion

In discussion, Robert Barro noted that since 1983 the US has become the world's number one super power; income growth has been high, and even the crime rate has eventually fallen. And has not the rate of church membership grown in some regions? He also wanted to know why a causal link was presumed between social capital and health status.

JP Cotis noted that there were some sympathetic echoes to the US data in other countries, including rising crime rates, lower participation, and lesser civility in France, for example. If these trends are parallel in other countries, perhaps it cannot be traced to specific elements of US public policy.

Lars Osberg wonders about the use of some indexes, such as that for democracy, without testing for non-linearity, and worries in general about treating ordinal variables as though they were cardinal.

Michael Wolfson wonders if Robert Putnam is willing to combine the diverse measures into a single index. And is it not better to talk about nurturing or growing social capital than it is about investing in it?

Judy Maxwell interprets Putnam as saying that the US has achieved very high growth at a cost of declining social capital. Is this a sustainable situation? If not, what is likely to be the outcome?

Jean Pierre Voyer posed to Putnam the question: Why has social capital fallen by all the measures he assesses? In reply, Putnam gave his pie chart containing his best attempts to explain the causal factors, with 10 percent due to urban sprawl, about the same amount to longer working hours for both men and women, slightly more to direct television watching, and about half to generational effects, with a third of that being specific to the TV generation. He still has a net 10 percent up for grabs. A number of changes in American life have reduced social capital in the US. A similar change took place at the end of the 19th century. It was fixed at the end of the 19th century by the inauguration, between 1890 and 1910, of most of the organizations that people joined for the next 60 years. As for now, the clock cannot be turned back, but there is a matching need for social entrepreneurship. There may be a role for public policy here, but the main innovations will likely be, as they were in the Progressive Era, in the private sector.

In reply to Lars Osberg, Bob Putnam says that democracy is in no sense a measure of social capital. Similarly, neighbourhood effects do not measure social capital, even though they may be correlated with such measures. In defence of Steve Knack, he noted that trust is correlated to a 0.85 level with other measures of social capital. Hence, in the absence of other cross-national measures of social capital, they may be used without much apology. Indeed, he feels that human capital may be getting the credit for benefits that are really attributable to social capital.

Barbara Wolfe wonders if the drop in club memberships may have been substituted for by workplace relations, at least for women. She also noted that when she lost her wallet in Italy, she was told that during the current scare about bombs, no one would pick up her wallet.

Bob Haveman agreed that education was treated as a privately chosen marketed commodity, with the results needing to be so interpreted. Without this assumption, the issue quickly becomes insoluble. Responding to Gunnar Eliasson, he wondered at the high estimate of on-the-job training costs. If so, then how could one raise the estimate of the combination to 20 percent of GDP? Finally, he responded to Putnam's questioning of the Wolfe-Haveman results based on neighbourhood effects. He argued that because these studies use education, and education is so highly correlated with social capital, they could be treated as social capital studies.

In reply, Robert Putnam noted that the simple correlation between stock measures of education and social capital, across states, is about 0.6, while a correlation between current student achievements and the level of social capital is higher.

Tom Healy advertised Jonathan Temple's background survey paper on the effects of social and human capital on growth and economic progress. He noted that for the growth regressions in the paper by Robert Barro for OECD countries, the significant variables were initial income, fertility, physical investment and openness to international trade. The failure of education to appear significantly matched the results of Sala-i-Martin, who ran six million regressions to find that the education variables were among the least significant of the 60 variables in his set of possible independent variables. However, more recent work by two Spanish economists, de la Fuente and Domenech, underlined the importance of data quality and their work showed that measures of educational attainment did appear to have a positive impact on economic growth for OECD countries over a long period of time.

Edward Glaeser agreed that there was a close link between social capital and education, since education teaches the networking skills that are employed in constructing social capital networks. If we believe anything about social capital, it is that externalities are rife. This makes it difficult to compare different types of group membership.

Barbara Wolfe agreed that most education is not privately paid for, so that there can be no direct estimate of willingness to pay.

Steve Knack noted that inequality, ethnic heterogeneity, legal enforcement and education all matter in the generation of trust. Of these, only education can be thought of as a usable policy lever. As for the lack of persistence of growth rates, and the relative stability of measures of trust, there is no alternative to waiting for more data.

Tom Schuller noted that in the UK there were very long work hours at the top and the bottom of the occupational spectrum. The only time-rich are the unemployed who do not have the education and high community levels of social capital that spur community involvement. Those who could contribute are at work, and the rest cannot easily participate. As a real-life experiment, what is the effect of the legislation limiting working hours on participation in social arrangements?

In reply, Walter McMahon replied to Gunnar Eliasson that Stanford and Berkeley might belong even more than California. He noted that the Psacharopoulos results quoted by Eliasson related to the developing countries, and not to the OECD, where the relevant margin is in higher education. In response to Richard Harris, he was glad to have support for a structural approach but agreed that the relevant time lags, and the time horizon, were very long.

4. Social Arrangements, Well-Being of Citizens and Economic Growth

The key questions for this and the final sessions (four and five) were:

- What are the main international measures of social well-being and progress in developed economies? To what extent are these measures reliably compared with economic growth trends?
- What can governments do to promote, renew and conserve social capital as well as enhance the skills and competences of various groups?
- Can social policies, to support learning, social engagement and labour market participation, promote economic growth and social well-being?
- Can some types of public social policy impair the development of social capital by supplanting the initiative of families, local communities and other actors?

13. Keynote: Jo Ritzen, "Social Cohesion, Public Policy and Economic Growth – Implications for OECD Countries"

Introducing the discussion, Jo Ritzen noted the necessity of being able to adapt to change, in a context where individual ministers and governments have limited room for manoeuvre. Globalization has increased the speed of access yet identity keeps very local and regional aspects. Institutions need to be built up around a common order. He regards social cohesion as "...a state of affairs in which a group of people (delineated by a geographical region) demonstrate an aptitude for collaboration that produces a climate for change that, in the longer run, benefits all." In his view, social cohesion captures two elements necessary to support economic growth – an inclusive civil society and responsive social institutions. From a communication point of view, Ritzen prefers to use the term "social cohesion," thus permitting social capital to have a narrower and more technical definition admitting the possibility of negative external effects. He adopts the view presented earlier by Woolcock, that social capital linkages include those of bonding, bridging and linking types, where they use the latter to connect people from different socio-economic groups.

Social cohesion and social exclusion can be seen as two sides of the same coin. Social exclusion has four main causes: poverty, unemployment, political exclusion and non-sustainable modes of development. Social cohesion is measured, in the literature, by:

- memberships of and participation in organizations
- measures of trust
- performance measures of public and private institutions
- income distribution measures
- ethnic heterogeneity
- measures of gender discrimination

On the side of evidence, Ritzen notes that membership trends are up in the Netherlands and Norway, and down in the US and France. But he sees some of the same problems in countries with rising and with falling membership patterns. He prefers trust, but this is also higher in the Netherlands and Norway than in the US and France. Where there is a little heterogeneity, there is substantial social cohesion. Where there is much diversity, assuming that institutions are in place to enable it to be properly handled, there are also few problems. The difficulties seem to arise in the middle ground. He interprets the reversal of global convergence as being due to a lack of social cohesion in the developing countries. Social cohesion is not a panacea, and is not a single variable, but it is complex.

14. Lars Osberg, "Comparisons of Trends in Gross Domestic Product and Economic Well-Being – The Impact of Social Capital"

Osberg started by noting that even Adam Smith pointed out the importance of accepted modes of responsible conduct. The modern debates and discussions have tended to home in on more precise definitions and to search for quantification. Osberg's own contribution is to quantify extensions to GDP as a measure of economic well-being. He has four basic components: consumption (adjusting for changes in leisure), wealth stocks, and measures of equality and security, with weights of

0.4, 0.1, 0.25 and 0.25, respectively. The measures of equality and security tend for most countries to show increased insecurity. Using the standard weights, well-being actually has been declining in several OECD countries since the 1980s, and for all countries the growth of well-being has been lower than of GDP per capita.

15. Rod Dobell, "Social Capital and Social Learning in a Full World"

Rod Dobell enlarged the scope of the discussion by extending the goals of economic and social policy to include environmental sustainability. He also extended the discussion to include the number, nature and linkages among the types of organization that interact in the policy-making process. One set of actors in these debates includes civil society organizations. His general point was that the ability of the system to produce flexible policy responses in the face of change depends enormously on the structure and credibility of the groups representing competing interests, plus a widespread agreement on the legitimacy of the process by which decisions are made. He sees a looming social capacity gap in attempts to manage the transition to a sustainable society. Coalitions of civil society interest groups have shown ability to block actions of various sorts, but there is less demonstrated capacity for coalitions to form that are likely to be both effective and to be widely accepted as legitimate. Issues of exclusion and polarization need to be faced head on.

16. Edward Glaeser, "The Formation of Social Capital"

Glaeser presents new research results helping to explain individual decisions to invest in social capital (or social skills). He first notes that most of the variation in measures of social capital take place at the individual level. The cost of investing in social skills equals the marginal time cost of acquiring these skills times wages. Benefits are equal to the sum of market and non-market gains adjusted for the length of expected life span and probability of moving house or job. The private and social benefits typically diverge (as in human capital theory). His model may be interpreted as an extension of human capital theory to social skills or competences facilitating social interaction and collective action. The starting point is the individual where a decision is made to invest in social skills in response to a perception of benefits and costs. In his theory, the returns from investing in local contacts are higher if there is lower probability of moving, and are higher the greater the number of remaining years of life span. The link between home ownership and social capital represents in part a lower expected probability of moving, coupled with the fact that the value of houses is linked to the quality of the surrounding community, providing the home owner with greater incentive to invest in social capital. People with more education are far more likely to be involved in their communities. This may be because these are in any event people with longer horizons. The links with education are equally strong for trust and memberships across states and countries. There is a strong downward cohort effect in trust in the US, but not generally elsewhere. But the effects of education are pervasive across all countries. He finds some linkages between the type of dwelling and the ways in which individuals choose to interact with each other.

17. Takashi Omori, "Balancing Economic Growth with Well-Being – Implications of the Japanese Experience"

Takashi Omori noted that Japan had a rich stock of social capital, as measured by mutual trust, that permitted rapid development when the country was first opened to the outside world, and more recently during rebuilding social and economic capacity over the past 50 years. Special features of Japan's stocks of social and human capital included:

- long-term trust
- stability of employment
- flexible management
- importance attached to trustworthiness
- company-specific skills
- strong emphasis on teamwork and information sharing

He presented some evidence that Japan's rich stocks of social and human capital became somewhat obsolete at the end of the 20th century, as there were changes in the apparent values of heterogeneity and innovation. Similarly, the pervasiveness of trust may have made regulators lax in the monitoring and upholding of standards ranging from nuclear safety to bank capital adequacy.

In conclusion, he proposed three categories of social capital:

- as an inferior substitute for markets and institutions
- as a complement to markets and institutions
- as a direct foundation for well-being

4. Commentary by Robert Haveman

Haveman finds himself perplexed by the linkages between social capital and economic performance. He bypasses this, and asks: Assuming that social capital is important, how can it be increased? He starts with Ed Glaeser's model. In this way, he proposes to extend the role of a discussant. But first he underlined the value and importance of efforts like those of Lars Osberg which underscore the limitations of GDP per capita as a measure of economic welfare and where both data and argument support the need to develop broader measures of economic well-being. He then turns to Glaeser's modelling of individual choices to gain and apply their social skills to build and maintain social contacts. If anything increases the individual's net benefits from acquiring social skills, there will be more acquired.

Haveman's examples of ways for internalizing the value of, and increasing investment in, social skills include:

- increase schooling or quality of schooling
- increase the teaching of social skills in schools
- reduce the rate of time preference
- increase available or discretionary time (through reduced hours of work for example)
- reduce ethnic or linguistic heterogeneity (this conflicts with the u-shaped evidence from Ritzen)
- extend the period of payout for social skills
- enhance the demand for social skills in employment

He listed several possible trends or policies, along with their likely impacts on private decisions to invest in networks:

- population aging reduces marginal private benefits of investing in social skills
- increasing income inequality is likely to reduce social capital
- work-oriented welfare reform has ambiguous effects (it may increase social capital by encouraging more social interaction through employment but may decrease social capital by reducing discretionary time)
- increased immigration is likely to reduce social capital
- enriched child care increases social capital
- decrease in organized religion reduces social capital
- decrease in two-parent families reduces social capital
- increased school choice may leave worst off behind (reduces social capital) while increased inter-racial contacts will increase investment
- Internet work reduces social capital

Implications for OECD research:

- What are the external benefits from the private acquisition of social skills – how does social capital create social benefits for those not directly investing in social skills?
- How can we distinguish those skills with positive and negative externalities (the downside of social capital)?
- Is it worthwhile for individuals to invest privately in social skills if there is no scope for them to use them because community demand for use of social skills is below some threshold level?

- Can moral suasion increase investment in social capital and at the same time boost the marginal private benefit?

4. Commentary by Tom Schuller

Tom Schuller took on the papers one by one. With respect to Ritzen's concept of social cohesion, Schuller thinks that it does not connote enough by way of the active commitment to others. He liked the Ritzen emphasis on the quality of education. He liked the breadth of the Lars Osberg measures, but wondered if they were perhaps so broad that they should be called well-being rather than economic well-being. He also appreciated the Dobell use of involvement, engagement and commitment, and wanted to think about a space where there are divergent and dissenting views set within a context where the process of resolution is accepted as legitimate. He disagreed with the Glaeser concentration on the individual, especially the presumption that the aged will be less involved in social contacts. However, he supported strongly Glaeser's emphasis on the importance of the physical environment. Omori's paper was uniquely valuable in tracing the trajectory of social capital and economic growth.

Five overall points:

1. the need to trace different trajectories of social capital, declines as well as growth, and link these to human capital
2. the need for multi-dimensionality in the analysis
3. the need to look at work and other environments, and the extent to which they serve to develop human and social capital
4. the need for empathy as one of the important social skills to be developed
5. the need to look more closely at the links between human and social capital

4. General Discussion

In opening the discussion, JP Voyer was uneasy about the narrowness of the scope of Glaeser's model. Robert Putnam agreed with JP Voyer, arguing that the benefits of social skills cannot be obtained without coordinating with others. Insofar as there is a coordination problem in exercising social skills, investment would be lower in areas where general levels of social skills are lower. You cannot go to a public meeting, or be the officer of a club, unless the clubs and meetings are there to be joined. Thus, the purely micro model is inadequate unless it takes a much more direct view of the environment within which the social networks operate.

Michael Wolfson wonders what is measured by the 60 percent share, since it does not matter for this whether the rest is in the hands of the rich or the poor. He also wonders about the narrowness of the Glaeser framework. The whole is greater than the sum of the individual parts. The framework needs to be dynamic, interactive and multi-level. He also wonders if we are celebrating education too much – perhaps there may be as strong a case in favour of zoning, public transit and the scope and nature of urban governance.

L. Cosier argued that if there is interest in the dynamics of change, it becomes necessary to consider multi-level governments, especially when the sub-levels may be operating competitively. Globalization may comprise three phases: travel, finance and information technology. At this third stage, there may be a new series of overlapping types of space. He would also like to see more attention devoted to unpacking the education box, moving from the teaching to the learning mode, and to cumulative learning. Two examples: some OECD research looking at low skills may be a productive line; second, there is a need to bridge from quantitative research to policy formation, especially in the realm of social capital.

Steve Knack is unsure about Ed Glaeser's emphasis on education, and about most or all of Haveman's policy implications.

Philip Hemmings interpolated between Glaeser and Putnam by saying that Putnam is emphasizing the nature of network externalities. Models need to embrace these.

Michael Woolcock sees many private-sector agents offering individuals aid in making contacts. Where are the likely externalities? They presumably increase efficiency, since those who know how to relate to others will be able to function better in any context of collaborative action. It is necessary to keep the social aspect of social capital. The emphasis should be on the networks.

Gunnar Eliasson is attracted to the Ritzen notion of social cohesion. He likes the conceptual clarity of the narrow definition, but wants things added. He also likes the individual investment approach in the Glaeser model. He wonders if facts and values were being inappropriately mixed in the Osberg estimates of well-being.

In reply to the commentators, Ed Glaeser took the opportunity to emphasize the economic approach to human and social behaviour. He agrees with Bob Putnam that you cannot build social capital alone, and that both the private and the social returns depend crucially on the presence of other players. The simplified model ignores these, but they are important. Even within associations, there is enough individual decision making to justify taking an individual-based approach. He argues that you should begin with the logic of individual choice, and then add the social context as and when possible.

Turning to the social cohesion concept, Robert Haveman asked what the link was between social cohesion and the older European concept of social solidarity?

Lars Osberg says that distrust among social groups may be in part due to the inadequacy of using GDP as a measure of economic welfare.

Barbara Wolfe wondered if so many of the groups that are measured for social capital are exclusionary, how are they likely to contribute to social cohesion, as opposed to their role in building networks for individuals?

Putnam replied that middle-aged white men are not very tolerant, but those who belong to veterans' groups are more tolerant. For almost all categories of groups, those who join turn out to be more tolerant than those who do not.

JP Cotis said that for France, the notion of social capital would fall flat – one more academic construct. He prefers by a great deal the concept of social cohesion, which goes far beyond social capital to extend to a sense of community solidarity. At an employment conference, he was unable to get English colleagues to accept the notion of social cohesion, but it has by now found its way even into the financial press.

Robert Haveman accepts Putnam's evidence that participation in voluntary associations has fallen. But has social participation fallen or risen when you take account of involuntary social participation? He has gone to increasing numbers of department meetings. The team concept is now more dominant in business life. Work plans are discussed and debated, in an involuntary way. Has this increase offset the other, and in what way?

Tom Healy is looking for clarification of the concept of well-being. The big picture is what policy makers require, but they need to be assured that the right things are chosen and measured. He agrees that matters of inclusion and weighting are to some extent arbitrary. Is it meaningful, whatever the weights, to add up consumption and shifts in the unemployment rate? Is it inevitable, by the construction, that Osberg's measure must grow less fast than GDP or consumption?

Jo Ritzen thinks that game theory should be employed in the analysis of investments in social capital. He still prefers social cohesion, to represent the norms and networks to the extent that they contribute to the ability to adapt to change. He also notes that ethnic diversity is not an impediment to social cohesion if it is appropriately managed. If there are language barriers, then even the choice of concepts should be done in a way that respects the pre-existing concepts and preferences of one's neighbours. Solidarity has a closer relation to income distribution, and is hence not quite so parallel to social cohesion. He notes World Bank research that over historical episodes a larger middle class tends to make a society more flexible. He agrees that the same size of middle class could be accompanied by quite different degrees of inequality between the richest and poorest quintiles.

5. Symposium Summary by John Helliwell

The program included human and social capital, inviting the participants to consider them in parallel. The papers and discussion did so, in some ways, but exposed dramatic differences between them. Indeed, one way of interpreting the results and discussion was that social capital provides new legs for the discussion and analysis of human capital. But that is leaping ahead. Starting at the beginning, the conference was asked to define the key concepts, to summarize the state of knowledge and assess the implications for future research and for policy.

Concepts

How Should Social Capital Be Defined?

Michael Woolcock argues for a crisp and narrow definition of social capital, as referring to "the norms and networks that facilitate collective action." He includes both the networking capacity of the individual as well as the ability of a society's members in general to deal with each other. He accepts, as does Putnam, that social capital thus measured may have good or bad effects when evaluated at the aggregate level, or even as seen by individuals who find themselves caught in networks whose norms they may dislike.

Where does this leave interpersonal trust, so often used as a social capital barometer? If trust is to be defined out of social capital, Gambetta (1988) and others would demand that it be given separate and equal billing. Indeed, much of the theoretical reasoning supporting the idea that social capital may have a payoff in terms of lower transaction costs is based on the fact that trust permits business and social dealings to respond flexibly to changing circumstances and unforeseen events. So would we prefer to speak of social capital and trust as separate analytical constructs, or to see the level of interpersonal trust as being part, and networks as another part, of a slightly broader notion of social capital? Bob Putnam, whose vote should get to count more than others, given his central role in the field, favours Woolcock's narrow interpretation, but is rather more open to the idea of including trust, or rather trustworthiness, as part of the norms. The comments of Tom Healy and Jo Ritzen suggest a similar inclination to keep trust pretty close to the centre of the scene.

When trying to evaluate these apparently competing notions, it is useful to refer to the generic procedures used in constructing capital stocks. One starts with an initial value, adds new gross investment, and subtracts the effects of depreciation and obsolescence. If we are interested in developing aggregate measures, should we not be open to an analogous procedure for social capital? How about sticking with the narrow networks definition at the micro level, and then when aggregating, making distinctions between networks with positive and negative externalities, including the extent to which they validate trust and encourage trustworthy behaviour? This would permit Tom Healy to continue to use the trust plus engagement shorthand for the aggregate measure, while providing some grounds for choosing, and for testing, what sorts of social capital at the micro level are likely to contribute to the value of the aggregate stock.

To provide yet another way of linking trust and social capital, how about this: trust is to engagement as test scores are to years of education. Following the narrow Woolcock definition, trust is not part of social capital, but if social capital is to have good effects, a major channel will be through building and maintaining personal trust. Similarly, the standardized test scores are neither education nor schooling, but are measures of the quality of the knowledge imparted in the schools. Under this interpretation, it is just as legitimate to use trust as a measure of the quality of the system of norms and networks as it is to use test scores to measure the success of an education system. The arguments for preferring scores to education years (i.e. they measure outputs rather than inputs, and take account of the effects of informal as well as formal education) could make one equally inclined to prefer trust to measures of the density of formal networks. Does this conflict with the Jo Ritzen preference for the term "social cohesion?" The two can perhaps be usefully merged, while recognizing that both carry some baggage from their earlier forays. Social capital may lend itself better to measurement, if we take the trust plus engagement version. Social cohesion attempts to go past the possibilities that some types of social capital, primarily the bonding rather than the bridging types – or, as Steve Knack put it, special interest groups with negative effects of the sort emphasized by Olson (1982) rather than horizontal associations of the sort thought by Putnam (1993) to generate trust and beneficial social ties - can have negative consequences for the society as a whole. Bonding refers to links with people like oneself, while bridging relates to links between those with heterogenous interests and characteristics.

There was general acceptance that human capital ought to include health as well as education, as emphasized by Michael Woolcock. There was evidence presented in several papers that there are important interactions between health and education. The costs of education return their personal and societal benefits over each individual's subsequent healthy years, and as those years increase then so does the present value of the gains from education. It works also in the reverse direction, although less obviously, as higher levels of education apparently lead to higher health status at the individual level, even after controlling for relative and absolute socio-economic status. However, it was apparent that most of the symposium papers dealing with human capital emphasized education. There were many references to the health effects of education, especially among the studies surveyed in the Wolfe and Haveman paper, but usually as examples of the non-market effects of education, rather than as part of human capital itself. There is certainly no requirement that papers dealing with education and its effects should have to cover the health linkages, and there may be no point in insisting that human capital should always be used in its broader form that recognizes health as a fundamental component. On the other hand, the use of the term with a narrower education focus should not be allowed to obscure from view the vitally important role of health in understanding the linkages among education, social capital and economic outcomes.

Conceptual distinction was also made between formal and informal education, with increasing attention likely to be focussed on the latter. To understand better the effects of education of both types, there is a need, as emphasized by Gunnar Eliasson, to understand the institutional context within which knowledge is generated, transferred and put to use. The same point could equally well be made about social capital.

Evidence

First, I present a listing of what may be some generally agreed results on the basis of the studies presented or reviewed for this symposium:

- Effects of education on macro-economic growth are stubbornly difficult to find.
- Indirect effects may be as important as the direct ones.
- Human and social capital may be as closely linked to each other at the micro or individual level as either is to economic and social outcomes at the more macro or aggregate level.
- Both education and social capital have strong linkages to health outcomes, welfare of children, and crime. Indeed, estimates of the overall rates of return on investing in, or nurturing, either education or social capital are likely to flow from the indirect effects, as shown by the survey presented by Wolfe and Haveman.
- There is a strong link from education to social capital at the individual level, most recently in Ed Glaeser's conference paper, but note the need to ensure that these effects are not just relative. In other words, positive associations observed at the individual level may not hold at more aggregate level as changing overall levels of education do not necessarily translate into higher overall levels of social capital (with echoes of the difficulty of making the jump from association between human capital and productivity at the micro to the macro level).
- There is evidence of negative effects of inequality on health, crime, human capital and social capital, although the exact pathways need more spelling out and testing.

- Many of the research methods and issues that have been identified for human capital apply also to social capital.
- Evidence was presented, especially by Gunnar Eliasson and Rod Dobell, that to understand how human and social capital work their magic or not depends vitally on the institutional structures, and the diverging interests, in which they are embedded. (Ed Glaeser makes a similar point when looking at the variation across individuals.)
- When modelling the acquisition of social skills, it is important to distinguish between stocks and flows.
- Social capitalists have a mild case of data envy with respect to human capitalists. Some of those already well versed in the education literature were quick to say that the envy was misplaced, given the gaps in coverage and between what was measured and what was needed.
- Finally, Takashi Omori emphasized the possibility that social capital can be not only instrumental, by making markets more efficient and fostering institutions supporting economic growth, but as an end in itself: belonging is its own reward.

Research Gaps to Be Filled

Following are some key questions that require further research before conclusions can be drawn:

To start with an obvious data question, why are different international measures of education so different, even where they are purporting to measure the same concept? Robert Barro's Table 3 is especially instructive, revealing very large differences between the Barro-Lee and OECD data. For example, the OECD data show that Canada has a population proportion with tertiary education 50 percent higher than in the US, while the Barro-Lee dataset shows almost exactly the reverse. The Barro-Lee dataset shows Germans with almost twice as many years of education as does the OECD data, and so on.

To what extent are the effects of education on outcomes relative versus additive or super- additive? The analysis in Ed Glaeser's paper, and in much of the literature, assumes that the effects are additive, with the possibility that there are also positive externalities at the community level. However, Nie et al. (1996) have challenged this assumption, arguing that the effects of education on participation apply only where one's education increases relative to the average level in the community. They argue, by contrast, that for trust, there is, and ought to be, evidence of positive externalities. These are what produce the superadditive effects referred to above. If education has strong effects on participation only in its relative form, then the evidence supporting increases in public education on grounds of positive externalities becomes much weaker. So the issue raised by Nie et al. needs to be taken seriously. Research reported by Helliwell and Putnam (1999) suggests that when the reference groups are chosen appropriately, there is evidence of positive externalities from education on both participation and trust. Similar research is required for a broader range of linkages among participation, trust, health and market incomes. The techniques must involve multilevel analysis, of the sort advocated and used by Doug Willms in his symposium paper, with both individual-level and ecological-level effects taken into account.

Once there is sufficient faith in the partial linkages, it will be necessary to assess them in a dynamic context that also recognizes their interdependence. This was, of course, the focus of the research developed and presented by Walter McMahon.

The same research issues arise with respect to participation. Steve Knack's paper provides a start in this direction, as he is searching for ways of distinguishing types of associational linkage that are more likely from those that are less likely to give rise to relative, absolute or super-additive effects; in other words, whether there are likely to be any external effects, and if so, whether they are likely to be positive or negative.

To what extent are nation states suitable units for analysis? Steve Knack argues that nation states differ enough to provide the power to test hypotheses. What there is much less evidence on is how levels of social trust and participation are linked at all across national borders. Since many measures and many studies show that economic and social interactions become sparser as distance increases, and especially where national borders intervene (Engel and Rogers 1996, Helliwell 1998), one would expect to find that there are corresponding differences in the tightness of the various measures of trust and horizontal networks. The reasons and consequences can best be studied with data that contain both geographic and political dimensions, to permit a clearer study of the possible aptness of the analogy between distance and borders as separators, and of the role of different social capital-type linkages as means of shortening these distances. The policy implications of this will be dealt with separately.

An OECD-specific research issue raised by Steve Knack is the need to explain why OECD samples are much less likely than more global samples to show positive growth effects from social capital. Robert Barro's results show that the same issue arises for education. Are the levels of social capital and institutional quality among OECD countries sufficiently high that diminishing returns have set in? It may not simply be a consequence of low data quality, since the measures are, if anything, likely to be of higher quality, and to have more comparable interpretations, for the OECD countries. However, de la Fuente and Domenech (2000) argue that removing anomalies in the existing data improves substantially the apparent economic effects of education on economic growth.

There is more linkage between R&D and education than much of the literature so far recognizes, given the high productivity effects of basic research (Griliches 1998, Chapter 4), coupled with the fact that much basic research is done in universities, with the costs charged to education and training, and the benefits attributed to R&D activities done elsewhere. Thus, some part of the impressively high direct and spillover returns from R&D are more correctly attributable to the research universities, which are the sources of the trained researchers and most of the fundamental research results.

Once the importance of national borders is recognized, it then becomes natural to consider more explicitly the extent to which measures of human and social capital can have international as well as national spillovers. Coe and Helpman (1995) have done benchmark studies on spillovers from one aspect of knowledge, that measured by cumulated and depreciated R&D spending, but there is little or no comparable work on human and social capital. As Michael Woolcock, Jo Ritzen and others emphasize, where social cohesion is constructed within a nation by means of internal bonding, the scope increases for a negative fallout for those in other countries. As Rod Dobell emphasizes, the fallout metaphor may be dangerously apt, as acid rain, nuclear fallout and global warming also pay no heed to national boundaries.

On the links between the results for human and social capital, Bob Putnam remarked that in the absence of better international measures of social capital, it is possible that measures of education may be getting the credit for social capital in cross-country studies, given the high correlation between education and social capital. But the burden of the evidence in several papers at this symposium is that, at least among the OECD countries, differences in levels of human capital show no significant positive contribution to subsequent economic growth. As already noted, the lack of strong empirical linkages from human capital to growth at the macro level may be due in part to data that are still not up to the job. If this should be a sustained result, it suggests, if Bob Putnam's inference is appropriate, that neither human nor social capital is likely to explain growth effects at the aggregate level. This does not deny the very real possibility that levels of human and social capital should have an influence on the level of measured output, and of course both have been shown to influence a wide range of non-market outcomes. Indeed, that is probably the strongest empirical message from the micro and macro studies described in the papers for this symposium – that the main effects of both human and social capital flow, at least in the first instance, through non-market outcomes.

If something is obviously important to human welfare, but has no easily measurable effect on the traditional measure of economic progress, then it may be time to extend the measures of results. This was the burden of Lars Osberg's paper, and the logic behind his advocacy of broader measures of economic well-being. Some of his extensions ran well beyond the economic, but all were clearly candidates for inclusion in more general measures of well-being.

Policy Issues

What can be done to increase the quantity and quality of international social capital, of the sort required to internalize at the global level the spillovers that arise from activities at the national level? Rod Dobell has emphasized the environmental aspects of this, as well as the difficulties of maintaining trust in political institutions when each new institution soon acquires its own interest group base and articulated self-interest.

More generally, how can the production of social and human capital be improved? Evaluation has gone furthest, and experiments are more prevalent, on the educational aspects of social capital. The linkages among health policies, health expenditures, health system management, social capital and health outcomes are increasingly studied, but the best means for policy intervention are still uncertain.

Can policy makers do more to check in advance to ensure that economic and social policy reforms do not damage the social fabric? Evidence and theory alike show that it is much easier to break down social capital than to build it up. Trust acquired over many years can be shattered very quickly. This is less clear with respect to participation, as Ed Glaeser noted in discussion: Bob Putnam's data show that the pre-1960 increases in US participation were about as rapid as the subsequent declines. The links between inequality and social capital are increasingly studied, but the causes of growing inequalities, and the nature and feasibility of the best policy measures for helpful intervention are not yet known.

Even for the US, where the long-time series of data have permitted the clearest measurement of the decline in social capital, the implications for policy are unclear. In discussion, and in the final chapter of his forthcoming book, Bob Putnam posed the challenge somewhat as follows: What is needed to arrest the decline in connectedness is for the next generation to repeat the institutional innovation of the Progressive Era, recognizing both the constraints and the opportunities imposed by 21st century technologies and lifestyles. Putnam's research shows that television has been a key culprit in the decline of social capital in the US, through both its content and the time it takes away from more direct human contacts. Television is not about to go away, but there is always scope for changing the content so as to encourage the accumulation of socially useful forms of social capital. If new role models are needed, could Homer Simpson and Arnold Schwarzenegger's film characters make plausible volunteers?

When thinking of policies that are friendly to the maintenance and development of social capital, the idea of "investing in" social capital may make it sound too concrete and too easy to manipulate. Nurturing may well be the better word, as was suggested by Michael Wolfson in the symposium discussions.

For other countries the data are much more limited. The efforts of Lars Osberg to develop comparable measures of a whole array of social indicators, as comparable as possible across countries and over time, should be greeted with enthusiasm and encouragement.

Finally, a last contrast between human and social capital. Whatever the difficulties in the design and evaluation of education, there is a genuine policy instrument, or scores of them, right at hand. There are education ministers, and they have tasks and budgets. But make yourself the minister of social capital and who would you talk to when you came to work in the morning? Social capital is itself a bridging concept.

What are the best ways of providing a policy focus to the unmistakable, and long overdue, resurgence of interest in the social and human aspects of development? The first task must be to start building bridging social capital among those concerned with the study and implementation of the full range of economic and social policies. The results reported to the symposium show an almost bewilderingly complex set of interdependencies among the various aspects of physical, social and economic health at both the individual and community levels. Research is needed to unravel these complexities, and there are scores of such efforts already under way in several countries. The tougher job will be to keep the policy process sufficiently open and aware to respond to the results of this research, and to foster the sort of experiment that can help to test some of the more promising policy options.

What are the implications for the OECD? The research reported at this symposium provides the strongest possible support for the OECD's continuing emphasis on horizontal linkages among policy directorates, and among the corresponding client ministries in national governments. The existence of lively OECD forums, and the provision of trusted pathways for the dissemination of the results of research and policy experiments, should be the lynchpins of the OECD's continuing contributions in this vital area.

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Appendix

19

Growth Effects of Education and Social Capital in the OECD Countries[1]

Jonathan Temple

1. Introduction

Public and private expenditure on educational institutions accounts for about 6 percent of the collective Gross Domestic Product (GDP) of the OECD-member countries, or roughly $1,300 billion each year.[2] This figure understates the true opportunity cost of educational investments, since it does not take into account forgone earnings. Overall, it should be clear that the provision of education represents a major commitment of resources within the OECD, and so measuring the associated welfare benefits is an important task.

One aim of this survey is to examine the available evidence on the benefits of education in developed countries. The main focus is restricted to the productivity benefits, a topic for which there is a considerable body of evidence, admittedly indirect. I will draw on research from two fields in particular, labour economics and empirical research on growth. An underlying argument will be that, although the labour economics literature does an impressive job of measuring the private returns to education, it remains the case that macro-economic studies have a complementary role to play in gauging the overall contribution of education.

The emphasis throughout is very much on education, rather than on any broader concept of human capital. The chief omission is any consideration of vocational training. This does not reflect my view of its relative significance, but rather the focus of the present survey on cross-country evidence. The nature of vocational training varies considerably across countries, and is tightly connected to production strategies (Broadberry and Wagner 1996). It is difficult to capture these differences in ways that lend themselves to empirical modelling. This means that, in explaining productivity differences across OECD countries, the cross-country evidence has little to say about the role of training, despite its potential importance.[3]

This is one area in which answers should be sought from labour economics and detailed comparisons of practices in individual countries, rather than from the cross-country empirical work surveyed here.

A second theme of the survey is the relation between growth and what has come to be known as "social capital." It is difficult to arrive at a precise definition of this term, and I will discuss this issue in more detail later on. For now, it can be thought of as capturing such things as the extent of trustworthiness, social norms, and participation in networks and associations. In the last few years, some prominent academics and commentators have argued that these qualities of societies are potentially valuable not only in themselves, but also because they make a contribution to economic success. This is another area in which cross-country evidence may have something worthwhile to contribute, and in the latter half of the paper, I will review the small but growing literature on the correlation between growth and measures of social capital.

Empirical work on social capital and growth is a very recent development, and with this in mind, I devote the majority of the survey to research on education and growth. Section 2 provides the theoretical background, and shows that recent models provide some good reasons for seeing education as a central determinant of growth. Section 3 turns to the empirical evidence. It starts with a brief account of research in labour economics, an essential step in understanding where the cross-country evidence may be relatively useful. The rest of the section, perhaps the heart of the survey, covers evidence from growth accounting and growth regressions, and then some recent attempts to measure externalities to education.

Section 4 turns to social capital and growth. The section discusses the definition of social capital, reviews the macro-economic evidence on its growth effects, and briefly discusses the prospects for further research in this area. Finally, section 5 rounds off with a summary and some conclusions.

2. Education and Growth

In thinking about education, both theoretical and applied economists have usually taken a rather narrow view of its benefits. This section begins by setting the narrow view in a wider context, something that is important in forming an overall opinion on policy. The remainder of the section discusses some recent theoretical models. The aim here is to see whether formal models shed any light on the possible connections between education and growth.

Education makes a fundamental contribution to personal development, and probably to the health of societies more generally. In thinking about policy, it is crucial to remember that education may have significant welfare benefits that are not captured in the models and data typically analysed by economists and governments. Given that economics is often defined as the study of the relation between the allocation of scarce resources and human welfare, the wider benefits are clearly within the remit of the subject. Benefits could include effects on public health, crime, the environment, parenting, and political and community participation; they are discussed in more detail in OECD (1998, ch. 4), Behrman and Stacey (1997), and Wolfe and Haveman (2001).

Even the benefits of education that accrue directly to individuals are not always well captured in economic theory and empirical analysis. It is plausible that education has both an immediate consumption benefit and a long-term effect on life satisfaction, other things equal. The difficulty here is that it is much harder to measure well-being in a meaningful way than it is to measure output of goods and services, and economists are only just starting to investigate well-being and its determinants. In an innovative paper, Blanchflower and Oswald (2000) report estimates of "happiness equations," regressions that relate survey measures of well-being to individual characteristics. They find that educational attainment is associated with greater happiness, even when controlling for family income.

Such findings could have important implications for education policy. For example, it is quite possible that the extent of an individual's education has a positive effect on the well-being of others, in which case self-interested individuals may tend to under-invest in education from society's point of view. Alternatively, education may affect happiness because it influences perceptions of status relative to others, in which case the results of Blanchflower and Oswald could overstate the effect on well-being of an expansion of educational provision.

Since not much is known about these effects, I will follow the literature in examining the consequences of education for productivity. A natural starting point is to think about the direct benefit, the difference a worker's education makes to his or her own output per hour worked. Under some assumptions, discussed below, the influence of education on productivity can be estimated using wage differentials between workers who vary in educational levels.

Compared to other measures of productivity, output per worker hour is often the best guide to welfare, not least because one benefit of an increase in hourly productivity may be that individuals choose to work fewer hours. Yet for some purposes, policy makers are interested in output per worker and output per head, as well as output per worker hour. Education may also have effects on these variables, and not simply through productivity. For example, education is often thought to affect labour force participation, particularly that of women.[4] It may also affect the non-monetary benefits associated with work and leisure, and so affect working hours.

Given that these effects are often less relevant to welfare than changes in hourly productivity, I will usually restrict attention to the latter. Even then, there are some other indirect effects of education to take into account. It is quite plausible that the extent of a worker's educational attainment will have an effect on the productivity of others that is not fully captured in the individual's own wages. Capturing such externalities to education using micro data is difficult, but significant progress has been made, and this work will be covered below. Externalities are also an important motivation for looking at the relation between education and growth at the level of countries.

Before turning to a detailed review of the evidence, I will briefly summarize theoretical work on the connection between education and growth.[5] It is often claimed that education plays a central role in growth. Can this argument be given a secure foundation in terms of economic theory? How plausible are the necessary assumptions? Do the models capture the growth effects of education, as it is generally defined and understood, or of something else?

One of the most prominent and influential contributions is that of Lucas (1988), which is in turn related to previous work by Uzawa (1965). In these models, the level of output is a function of the stock of human capital. In the long run, sustained growth is possible only if human capital can grow without bound. This makes it difficult to interpret the Uzawa-Lucas conception of human capital in terms of the variables traditionally used to measure educational attainment, such as years of schooling. Their use of the term "human capital" seems more closely related to knowledge, rather than to skills acquired through education.

One way to relate the Uzawa-Lucas model to the data is to suggest that the quality of education could be increasing over time (Bils and Klenow 1998). In this view, the knowledge imparted to schoolchildren in the year 2000 is superior to the knowledge that would have been imparted in 1950 or 1900, and will make a greater difference to their productivity in later employment. On this interpretation, even if average educational attainment is constant over time, the stock of human capital could be increasing in a way that drives rising levels of output.

Yet this argument runs into difficulties, even at the level of university education. There may be some degree courses in which the knowledge imparted currently has a greater effect on productivity than before (medicine, computer science, perhaps economics), but there are other, less vocational qualifications for which this argument is less convincing. At the level of primary and secondary schooling, with their focus on basic skills such as literacy and numeracy, the idea that increases in the quality of schooling drive sustained growth seems even harder to support. Finally, note that these models are typically silent on exactly how the increase in the quality of schooling is brought about: individuals can raise the stock of human capital, or knowledge, simply by allocating some of their time to its accumulation.

An alternative class of models places more emphasis on modelling the incentives that firms have to generate new ideas. Endogenous growth models based on the analysis of research and development (R&D), notably the landmark contribution of Romer (1990), yield the result that the steady-state growth rate partly depends on the **level** of human capital. The underlying assumption is that human capital is a key input in the production of new ideas. In contrast with the Uzawa-Lucas framework, this opens up the possibility that even a one-off increase in the stock of human capital will raise the growth rate indefinitely. Indeed, in many endogenous growth models, human capital must be above a threshold level for any innovation to take place at all.

In practice, the generality of these results, and the contrast with the Uzawa-Lucas model, should not be overdrawn. The Uzawa-Lucas framework can be seen as a model of knowledge accumulation in a similar spirit to that of Romer, but easier to analyse; and restrictive assumptions are needed to yield the Romer result that the long-run growth rate depends on the level of human capital (Jones 1995). But even under more general assumptions, a rise in the level of human capital is likely to be associated with a potentially substantial rise in the level of output and welfare, brought about through a transitional increase in growth rates.

In most endogenous growth models based on R&D, the stock of human capital is taken to be exogenously determined. More recent papers, notably Acemoglu (1997) and Redding (1996), have relaxed this assumption, and considered what happens when individuals can choose to make investments in education or training, while firms make investments in R&D. For some parameter values, multiple equilibria are possible, since the incentives of workers to invest in human capital, and those of firms to invest in R&D, are interdependent. This provides a way of formalizing earlier ideas about the possible existence of a "low-skill, low-quality trap" in which low skills and slow rates of innovation reflect a coordination failure (Finegold and Soskice 1988). The models suggest that, at the aggregate level, greater investments in education or training might raise expenditure on R&D, and vice versa.

Another interesting aspect of recent growth models is their suggestion that individuals may under-invest in education. Rustichini and Schmitz (1991) examine this argument in some detail. They present a model in which individuals divide their time between production, original research and the acquisition of knowledge. Each individual knows that acquiring knowledge (through education) will raise his or her productivity in subsequent research, but since individuals do not fully capture the benefits of research, they will tend to spend too little time acquiring knowledge relative to the socially optimal outcome.[6] Rustichini and Schmitz calibrate a simple model, and find that although policy intervention has only small effects on the allocation of time to education, it can have a substantial effect on the growth rate.[7]

In summary, these models are important for several reasons. First, they see human capital as an important input in the creation of new ideas, and this mechanism provides a relatively appealing justification for viewing education as a central determinant of growth rates, even over long time intervals. Second, they sometimes yield the result that the laissez-faire outcome delivers slower growth than is socially optimal. Third, the models suggest that policy makers wishing to raise the level of welfare have several options: not just subsidies to R&D – which may be difficult to implement and monitor – but also subsidies to certain kinds of education, perhaps especially those which could lead to later work in R&D. Overall, the models suggest that, in searching for the determinants of growth, education is one of the first places to look.

3. Education and Growth – The Evidence

As described above, recent theoretical models suggest that educational attainment is potentially a key determinant of growth. In this section, I will turn to the attempts of economists to quantify this effect. The main focus will be on the macro-economic evidence: the body of research which measures, or attempts to measure, the productivity benefits of education using the variation in educational attainment and growth rates across countries.

It would be a mistake, however, to review this evidence without first discussing the work on education and earnings by labour economists. Many of the arguments that education can affect growth ultimately depend on the relation between individuals' education and their levels of productivity. Evidence for this effect, even measured indirectly using data on earnings, would obviously strengthen the overall case for seeing education as a determinant of growth outcomes.

Moreover, an understanding of the strengths and weaknesses of findings in labour economics helps place the macro evidence in context, clarifies the areas in which the macro approach may have something worthwhile to contribute, and also points to the areas in which micro evidence is much more likely to be fruitful. With this in mind, section 3.1 reviews studies of the effects of education based on earnings surveys. Later sections cover growth accounting (3.2), the evidence from cross-country regressions (3.3), and recent work on externalities to human capital (3.4). Finally, section 3.5 attempts to tie together the various pieces of evidence.

It will be argued that each approach to measuring the productivity effects of education has its own important weaknesses and areas of uncertainty. Yet taken together, the various methods tend to agree in pointing to quite substantial effects of education. These effects are probably large enough by themselves to justify current expenditure on education within many OECD countries, even before consideration of wider benefits. Broadly speaking, this work might also justify an expansion of educational provision in at least some countries, with a consequent effect on the growth rate that can be assessed using the methods of growth accounting.

3.1 Evidence from Labour Economics

Labour economists typically study the link between education and productivity using survey data on the earnings and characteristics of large numbers of individuals. The techniques used to analyse these data have become increasingly sophisticated, and we will see that evidence from "'natural experiments" provides measures of the private return to education that are probably quite accurate. There is much greater disagreement on the extent to which labour economists have identified the **social** return to education. A particularly important argument is that educational wage differentials (and hence measures of the private return) may largely reflect the value of educational qualifications as a signal of ability. As a result, even the high private returns found by labour economists are potentially consistent with the view that education does not affect productivity. Later in this section, I will discuss the extent to which even the most recent evidence is vulnerable to the signalling critique.

The standard empirical approach is to explain the variation in wages across individuals using regressions, where the explanatory variables include years of schooling, either age or a simple proxy for experience, and other characteristics. The most popular specification draws heavily on the work of Mincer (1974), and earlier contributions on "human capital earnings functions." The starting point is typically a specification that looks something like this:

$$\ln w = \alpha + \beta_0 S + \beta_1 E + \beta_2 E^2 \tag{1}$$

which relates the natural logarithm of wages (w) to years of schooling (S) and a proxy for labour market experience (E). Under some assumptions, and given the semi-logarithmic formulation, the coefficient on schooling can be interpreted as the private return to education. Under the assumption that workers are paid their marginal product, this coefficient may also capture the social return to education. Empirical estimates of the return typically have a relatively small standard error and lie somewhere between 5 and 15 percent, depending on the time and country.

The evidence that earnings are positively associated with schooling is robust and uncontroversial; the obvious difficulty lies in giving this association a causal interpretation. Over time, labour economists have built up considerable knowledge of the problems in using estimated earnings functions to draw inferences about the direct contribution of education to productivity. Card (1999) provides an excellent review and synthesis of this literature, and I will give only a broad overview of the relevant issues.[8]

One of the most easily understood problems is that, through lack of suitable data, the econometrician estimating (1) inevitably has to omit important variables that are likely to be correlated with both schooling and earnings. Family background and traits such as innate ability or determination are notable examples. The basic problem, from the econometrician's point of view, is that the group of people with a relatively advanced level of educational attainment is not a random selection from the population as a whole. For example, if more able individuals have relatively high earnings regardless of extra education, and also choose to spend more time in school, then the estimated return to schooling overstates the effect of education on productivity. If ability is not observed by employers, then the regression estimate may still capture the private return to schooling, but it will not capture the social return that is ultimately our main interest.

Unfortunately, the problems do not stop there. It seems probable that the costs and benefits of education vary across individuals, perhaps substantially. Indeed, this is likely to be the principal cause of the variation in completed schooling that the econometrician uses to identify the effects of education. The heterogeneity will typically mean that the private returns to education vary across individuals. In the unlikely case where the returns vary independently of the explanatory variables, the least squares estimate should recover an unbiased estimate of the average return. More generally, the heterogeneity problem will lead to biased estimates. For instance, imagine that there are differences in the quality of schools: it seems quite likely that students in a higher quality school will achieve a higher return to their education, and also choose more schooling. This correlation between the estimated parameters and the explanatory variables will give rise to a bias in the estimate of education's effect.

The recent focus of the literature on education has been on identifying natural experiments, in the hope that these will allow stronger claims about causality to be made. Researchers look for situations in which the level of schooling varies across individuals for reasons that are likely to be independent of the unobserved characteristics of those individuals (ability, determination, and so on).

The idea is best explained by means of an example. A good starting point is one of the most influential papers, by Angrist and Krueger (1991). The paper starts from the observation that, when it is compulsory to stay in school until a certain age, individuals born earlier in the calendar year will reach the legal minimum age for school-leavers at an earlier stage in their education. As a direct result, there is likely to be a correlation between an individual's quarter of birth and their length of schooling. The correlation means that quarter of birth can potentially be used to identify exogenous variation in schooling – that is, variation independent of unobserved characteristics like ability or determination. In econometric terms, quarter of birth can be used as an instrument for schooling, under the maintained assumption that characteristics other than schooling are independent of quarter of birth. Somewhat surprisingly, Angrist and Krueger find that the instrumental variable estimates of the return to schooling are similar to the least squares estimates, supporting the idea that conventional estimates are reasonably accurate.

Another much discussed natural experiment is provided by identical twins who have different levels of schooling. Given that such twins have the same genes, and will usually share the same family background, the wage differential between twins with different years of schooling may provide useful information on the productivity effect of education. Finally, other natural experiments are provided by the possible connection between the geographical proximity of colleges to individuals, and their choice of schooling (see Card 1999).

Research of this kind has considerably strengthened the case for productivity effects of education, but even these studies retain an important weakness. It has long been understood that the private return to education may exceed the social return. The theoretical work of Spence (1973) indicated that educational attainment may be valued by employers mainly because it acts as a signal of innate ability, and not because it has an effect on productivity.

Models of signalling start from the observation that individuals have traits which employers value but do not observe at the time of hiring (ability, determination, and so on). If there is a systematic association between these traits and the costs and benefits of education, this may lead to an equilibrium in which high-ability individuals stay in school longer because this decision signals their ability to employers. This argument provides a plausible reason for a correlation between ability and years of schooling, and suggests that earnings may be correlated with schooling even if schooling has no effect on productivity.

Few doubt that signalling plays some role in explaining educational wage differentials, but its overall importance remains controversial. Weiss (1995) and Quiggin (1999) provide very different perspectives on the theoretical generality and empirical validity of signalling models. There are two main arguments against such models, which note the implications of the assumption that education has no effect on productivity. First, given the wage premium earned by those with more years of schooling, employers would probably have strong incentives to conduct their own tests of ability and other characteristics, and use this direct information rather than the somewhat indirect signal provided by the schooling decision. This view is supported by evidence that measured performance in school and universities is correlated quite strongly with the outcomes of tests carried out at an earlier stage (see Quiggin 1999 for references). Yet the argument is not conclusive, mainly because employers may not be able to appropriate the returns to acquiring more information about their employees; other firms could bid away those workers found to have higher ability (Stiglitz 1975).

The second argument is that, if education does not affect productivity, one would expect to see the education differential decline with job tenure, as employers acquire direct knowledge of the characteristics of their employees. This does not seem to be observed in the data, although this question has not received the sustained attention it probably deserves.

More generally, there is clearly room to develop and test signalling arguments in more detail. This is important not least because, as Weiss (1995) has pointed out, even the results of natural experiments are not necessarily inconsistent with the signalling view of education. To see this, recall that employers may use years of schooling to gain information about unobserved characteristics. The results from the Angrist and Krueger quarter-of-birth study and the work on twins can easily be interpreted in terms of these signalling effects, and so their findings do not contradict even the extreme view that productivity is entirely independent of education.

For example, using wage differentials between differently educated twins tells us only about productivity effects of education if employers observe the other characteristics of their employees, and reward them appropriately. If we are prepared to assume that employers do not observe these characteristics, and that a signalling model applies, then even the native ability of the twins will appear different to prospective employers, since they have different schooling. To assess fully the signalling argument using evidence from twins, the relevant natural experiment is not whether twins with different schooling are paid differently. The relevant experiment, much harder to find, is whether twins with different schooling but the same employer are paid differently.[9]

In summary, there is an ingenious and persuasive body of work which measures the returns to schooling while making plausible assumptions about the variables not observed by the econometrician. More accurate estimates of the private return to schooling will be extremely hard to achieve. Unfortunately, this does not tell us all we need to know about social returns, or productivity effects. To interpret even the latest evidence as telling us something about productivity effects, we have to make some potentially unattractive assumptions about the extent to which certain variables are observed by employers. As a result, the current estimates of private returns, however accurate, may remain quite misleading about social returns.

For now, assume that employers fully observe all relevant characteristics, and hence do not infer any information about them from schooling decisions. Even in this case, as Card notes, not much is presently known about the mechanisms by which education might contribute to higher wages. The simplest interpretation of the evidence from earnings functions is that more educated individuals are more productive, whatever their chosen occupation. In practice, a college degree is unlikely to make one a better postal worker or road sweeper.

It seems likely that more complex mechanisms are present, and these may again have implications for the interpretation of earnings functions. For instance, more educated workers may have better access to those jobs in which workers share some of the rents earned by imperfectly competitive firms. If mechanisms like this are at work, there would again be less reason to believe that the observed correlation between schooling and earnings represents solely a direct productivity effect.

There are other ways in which private and social returns could differ. In some countries, especially poorer ones, the public sector is a major employer of the well educated. As Pritchett (1996) emphasizes, the assumption that wage differentials reflect differences in marginal products is much harder to sustain in this context. If educational credentials are used as a means of determining access to rationed high-paying jobs in the public sector, estimated earnings functions may detect an effect of education even when it has little or no effect on productivity.

The general problem is that estimates of earnings functions capture, at best, the private return to education, yet it is the social return which is of most interest to policy makers. The two may diverge for a number of reasons, including the possibility that education functions purely (or mostly) as a signalling device. The arguments discussed above imply that the social return to education is less than the private return and, as we have seen, even just a lower bound on the social return is difficult to establish.

It remains worth remembering that other mechanisms will have a positive effect on the social returns to education. It is plausible that individuals do not fully capture some of the benefits to society of their schooling, and I will review some of the empirical evidence on externalities in section 3.4 below. Another important argument is that educational provision may play a valuable role in allowing a more efficient matching between workers and jobs (Arrow 1973, Stiglitz 1975). In other words, even if education does act mainly as a signal, there should not be a presumption that education is, therefore, socially wasteful.

Overall, labour economists appear keen to note the extent to which recent studies, based on variation in institutions or differences in schooling between twins, continue to support the view that schooling has a causal role in raising productivity and earnings. Card (1999) concludes that the average marginal return to education is unlikely to be far below the estimate that emerges from simple least squares estimates of earnings functions.

The view that this represents a productivity effect is far from universally accepted, however. As we have seen, Weiss (1995) argues that even the most recent results can be interpreted in the light of signalling models, and that labour economists have been strangely reluctant to acknowledge the potential relevance of this approach. This viewpoint suggests two lines of enquiry that might be particularly fruitful. The first is further theoretical examination (and perhaps calibration) of signalling models, with a particular focus on the extent to which they can incorporate the direct productivity effects envisaged in the traditional theory of human capital. Second, more evidence on the extent to which educational wage differentials evolve with job tenure could be of great interest in advancing the debate.

3.2 Growth Accounting

The labour economics literature provides a wealth of evidence on the private returns to schooling. As we have seen, the contribution made to productivity by education is uncertain but may be worthwhile, even before we start to think about possible externalities. Making similar assumptions to those of labour economists, the "growth accountants" have set about the complex task of evaluating this contribution relative to other sources of growth. Again, we will see that the degree of uncertainty is considerable. Even the most careful and rigorous studies may substantially mismeasure the overall contribution of education.

Growth accounting essentially divides output growth into a component that can be explained by input growth, and a "residual" which captures efficiency change, partly reflecting changes in technology. In explaining the change in output, the change in the quantity of each input is weighted by its marginal product, proxied by its market reward. This principle can be extended to any number of inputs, and where sufficiently detailed data are available, it is possible to disaggregate the labour force into various categories, where each type of worker is weighted by the average wage of that type.

For instance, in analysing the contribution of changes in educational attainment, the researcher disaggregates the labour force by level of schooling, and often by other available characteristics such as age and gender. Changes in the number of employees at each level of schooling are then weighted by their marginal products, proxied by the mean income associated with each schooling level, to give the overall change in an index of "effective" or quality-adjusted labour. This ultimately allows the researcher to quantify the proportion of output growth that can be directly attributed to increases in educational attainment.

Griliches (1997) provides a brief but useful survey of this literature, and points out the two major assumptions, both of which will have a familiar ring to readers of the previous section. First, it is assumed that differences in observed market rewards correspond reasonably closely to differences in marginal products. Secondly, the calculations assume that differences in market rewards across schooling levels originate in schooling, and not in other factors such as native ability or family background that may be correlated with schooling.

The advantage of the first assumption, that market rewards correspond to marginal products, is that it allows the growth accountant to weight the growth rates of factor inputs using available data on factor shares, under the assumptions of constant returns to scale and perfect competition. Less restrictive frameworks are possible, but will generally tend to require assumptions about other parameters for which data are not readily available. It should also be clear that conventional growth accounting, imputing output elasticities based on market rewards, will not shed any light on the possible extent of externalities. This is a major limitation, and an important motivation for the cross-country empirical studies that will be considered further below.

What of the second assumption, that differences in wages originate in schooling? The danger here can be seen from considering an extreme scenario, in which education has absolutely no effect on an individual's productivity, but more able individuals both stay longer in school and earn more while in employment.[10] This scenario clearly implies that educational attainment and earnings are positively correlated. Now, consider an exogenous increase in the proportion of individuals with the highest level of education: since the index of labour quality weights the numbers in each education class by the mean income of that class, the index must increase. As a result, the growth accountant will attribute some portion of growth to educational improvement, even though education plays no role in productivity gains.

This assumption clearly brings us back to the labour economics literature, perhaps looking for reassurance that education plays at least some role in raising productivity. As we saw in the previous section, many prominent labour economists seem to regard the observed correlation between earnings and schooling as largely reflecting a genuine productivity effect of education. If they are right, growth accounting provides a rough lower bound for the overall contribution of education to growth.

Growth accounting exercises vary widely in the extent to which they disaggregate labour input. Nearly all the studies which carry out a detailed disaggregation by level of schooling are restricted to the US: a prominent example is Jorgenson, Gollop and Fraumeni (1987). For the period 1948 to 1979, they find that growth in labour input contributed about a third of growth in aggregate value added, where the measure of labour input takes into account both hours worked and the quality of labour. Changes in their aggregate index of labour quality are based on changes in the composition of total hours worked by age, sex, education, employment class and occupation. They find that a favourable shift in labour quality is responsible for about a tenth of the growth in value added, or about a fifth of the productivity residual that remains after accounting for the contribution of growth in physical capital (see their Table 9.5).

In interpreting the results of Jorgenson and colleagues, it is important to note that some of the compositional shifts within the labour force have a **negative** effect on the index of labour quality over the 1948 to 1979 period, which partly offsets the benefits of improvements in educational attainment. As previously noted, the calculation of the labour quality index assumes that differences in market rewards reflect genuine differences in marginal products. One consequence is that the increasing entry of women and young workers into the labour market, mainly into low-paying jobs, has a negative effect on the aggregate index of labour quality.

Over the 1948 to 1979 period, the negative effect on the index of labour quality is more than offset by positive changes in the composition of the labour force by educational attainment and occupation. One implication is that the latter effects are likely to be responsible for more than a fifth of the productivity residual, since the favourable shift in labour quality would have been larger in the absence of the change in composition by age and sex.

In reviewing the evidence as a whole, Griliches (1997) writes that increases in educational attainment seem to have accounted for perhaps a third of the productivity residual in the US over the post-war period. In the 1950s and 1960s, this would correspond to an effect on the annual growth rate of aggregate output of around 0.5 percentage points; during the 1970s productivity slowdown, the effect of educational improvement would have been lower, perhaps raising the growth rate by 0.2 or 0.3 percentage points.

For other OECD members, there are few studies that cover recent experience in the same degree of detail as Jorgenson and colleagues. The best-known work in this respect is that of Maddison (1987, 1991). I will first consider the general trends in educational attainment that are highlighted by his work, and then measures of the impact that are derived from growth accounting. More detail on the general trends can be found in OECD (1998, ch. 2).

Maddison (1991, p. 138) argues that the 20th century saw a relatively steady improvement in educational attainment for the six countries he considers (France, West Germany, Japan, the Netherlands, UK and US). One implication is that changing trends in educational attainment are unlikely to provide a satisfactory explanation for the transition from

Europe's "Golden Age" of rapid growth (1950–1973) to the productivity slowdown after 1973.

Examining trends in more detail, Englander and Gurney (1994a) note that tertiary education in particular has expanded rapidly in many OECD countries since 1960. Even in the absence of further increases in tertiary enrolment, the average educational attainment of the labour force will continue to increase for some time as older, less well-qualified workers retire from employment. It may be too early to tell whether or not this continuing increase in average attainment has resulted in a significant growth payoff.

Maddison (1987, 1991) estimates the growth impact of changes in educational attainment for six countries by disaggregating the labour force into those with primary, secondary and higher qualifications. He then combines these three types of labour using weights that are the same across countries and over time. Perhaps more importantly, in selecting the weights, he follows Denison (1967) in assuming that observed educational wage differentials overstate the contribution of education to productivity, because the differentials are also affected by other characteristics that are correlated with schooling. Inevitably, adjustments for the size of this effect are somewhat arbitrary. They highlight, rather than eliminate, the uncertainty inherent in using growth accounting to measure the impact of changes in educational attainment. The other point to note is that, because of these adjustments, the estimates of Denison and Maddison are not directly comparable with those of other studies.

With all this in mind, we can turn to Maddison's results on the contribution of increases in labour quality to output growth in France, West Germany, Japan, the Netherlands, the UK and the US. His figures suggest that changes in the quality of the labour force typically added between 0.1 and 0.5 percentage points to annual growth rates between 1950 and 1984 (his Table 20). The Maddison index of labour quality takes into account changes in the male/female composition (though not age composition) of the labour force, as well as changes in educational attainment. In countries where the proportion of women in the labour force has noticeably risen, such as the UK and the US, the contribution of education to growth will be slightly higher than the reported contribution of growth in labour quality. For other countries, the difference between the two figures will be very small, and certainly dwarfed by the other sources of uncertainty that surround the approach.

More recent studies include that of Jorgenson and Yip (1999), who have recently carried out a detailed growth accounting exercise for the G7, and present estimates of growth in labour quality for 1960 to 1995 (their Table 7). These estimates suggest that labour quality has grown particularly quickly in Japan and, to a lesser extent, relatively quickly in France and the US. The Jorgenson-Yip disaggregation of the labour force is slightly finer than that adopted by Maddison, and this makes it harder to assess the role of education within changes in the overall index of labour quality.

A useful survey by Englander and Gurney (1994b) draws together the results of a number of studies for the G7, although some of this evidence is based on regressions rather than growth accounting. Their summary suggests that for the 1960s to 1980s the growth of labour quality (sometimes including demographic effects of the kind discussed above) typically accounts for 10 to 20 percent of growth in total output. In some ways, it is more informative to look at the fraction of growth in output per worker that is explained. Growth in output per worker is lower than output growth in those countries, like the US, where there has been a rapid increase in employment. In such countries, the increase in educational attainment will sometimes account for a proportion of growth in output per worker slightly higher than the 10 to 20 percent suggested by the survey of Englander and Gurney.

Another OECD country for which detailed growth accounting results are available is Korea. The most influential contribution is that of Young (1995), who examines and compares the growth performance of four East Asian economies. For the purpose of the present survey, the case of Korea is particularly interesting in that the country has seen a dramatic increase in the educational attainment of the labour force. Between 1966 and 1990, the proportion of the working population with secondary level education or higher roughly trebled, from 27 to 75 percent. Yet this dramatic expansion does not translate into an equally dramatic effect on the growth rate, at least under the assumptions of growth accounting. For each of the four economies he considers, Young finds that the improving educational attainment of the workforce raises the annual growth rate of effective labour input by about one percentage point (Young 1995, p. 645).

I end this section by noting a crucial qualification to all growth accounting results. Findings in this area require careful interpretation, because the approach does not tell us everything we need to know about the relevant counterfactual.[11] As an example, consider a claim that X percentage points of growth in a given country is due to a change in the quality of the labour force. This does not imply that, in the absence of the change in labour force quality, the growth rate of output would have been precisely X percentage points lower. The problem is that educational attainment may have other, indirect effects on output through labour force participation, investment, and even R&D and the growth of total factor productivity. Growth accounting does not capture these indirect effects, and so it is necessarily silent on the overall importance to growth of variables like education.

3.3 Evidence from Growth Regressions

Although growth accounting exercises are informative and often useful, it is clear that they are not a complete substitute for other forms of investigation, given the necessary assumptions. Griliches (1997, S333) writes that "the main, and possibly only, approach to testing the productivity of schooling directly is to include it as a separate variable in an estimated production function." Such estimates could be at the level of firms or regions, but much of the evidence uses the variation in education across countries, and it is to such estimates that I turn next.

As the quotation from Griliches makes clear, the key attraction of growth regressions is that they provide a way of testing directly for productivity effects of education. Similarly, Arrow (1973, p. 215) pointed out that the use of macro-economic evidence would be one way of testing the signalling arguments, although he also expressed scepticism about the usefulness of this empirical approach.

Recent work on these issues has led to a better understanding of precisely when and where scepticism might be justified. In what follows, I will review the most important problems associated with measuring growth effects of education at the macro-economic level. An underlying theme is that, despite these problems, there are some grounds for optimism that this research can make a valuable contribution.

This may seem surprising, given that several well-known papers in this field take very different views on the importance of education. Now, however, a more coherent story is emerging, one which is consistent with the effects identified by labour economists, and which can also explain why some cross-country studies have failed to detect any significant effect of education using aggregate data. As we will see, as the treatment of measurement and specification issues has improved, stronger findings have started to emerge.

One of the best known and most influential contributions to the empirical growth literature is that of Mankiw, Romer and Weil (1992) or MRW. Their parameter estimates for an OECD sample can be used to illustrate the potential importance of education. If taken at face value, their estimates imply that if human capital investment (as a share of GDP) is increased by a tenth, output per worker will rise by 6 percent; if investment in human capital is doubled, output per worker will eventually rise by about 50 percent. (The details of this calculation are described in the Appendix.)

It is essential to emphasize that these figures should not be taken too seriously. All growth regressions share a number of important statistical problems. In the case of MRW, even quite simple extensions, such as the inclusion of equipment investment in the regressions, mean that it can be difficult to get precise estimates of the relevant parameters. Sometimes, the hypothesis that education has no effect cannot be rejected (as in Temple 1998, Tables 2–4).[12] In the present context, another drawback of most regression studies is their focus on a large sample that includes less developed countries as well as OECD members. One should clearly be rather wary about drawing conclusions for OECD policy based on samples that are often dominated by developing countries. I will usually concentrate on the few studies that include separate estimates of regressions for OECD members (or alternatively, samples of rich countries).

Researchers have generally used one of two specifications in modelling growth and education. In the first, and most common, the researcher chooses to regress growth on control variables and the initial level of an education measure, such as the secondary school enrolment rate or (preferably) average years of schooling. The underlying idea is that the stock of human capital could affect subsequent growth in a variety of ways, notably by influencing a country's ability to adopt technology from abroad.[13]

Those working along such lines typically find an effect of schooling that is both large and precisely estimated, at least when initial output per worker is also included as an explanatory variable (Barro 1991). Yet, it is not clear that these results are applicable to OECD members. In an interesting exercise, Englander and Gurney (1994a) re-estimate growth regressions based on four influential papers, including Barro (1991), but restricting the sample to the OECD. Three of the four sets of regressions include human capital variables, typically primary and secondary school enrolment rates.[14] These variables turn out to perform relatively well, but are still far from robust. In further work, it may be valuable to repeat this exercise, drawing on more recent data sets that allow one to use average years of schooling rather than enrolment rates.

Another interesting paper that includes results for OECD samples is Gemmell (1996). He emphasizes the problems of using enrolment rates, and constructs alternative measures of human capital based on attainment at the primary, secondary and tertiary levels. For a sample of 21 OECD countries, he finds a correlation between the number of people with tertiary qualifications and subsequent growth. He also finds some evidence that investment in OECD countries is positively correlated with the extent of secondary schooling in the labour force.

One drawback of most cross-country work is the likelihood of important differences in the nature and quality of schooling across countries, which could undermine the usefulness of international comparisons. Even such things as the length of the school year can show a surprising degree of variation across countries. An alternative data set, which may overcome these problems to some extent, has been introduced by Hanushek and Kim (1995). They propose measuring educational attainment using scores in international tests of cognitive skills in maths and science. Their results support the idea that education has an important effect on growth. Again, the sample includes less developed countries, and it would be interesting to examine the robustness of the results in a sample restricted to OECD members.

The lack of studies with direct relevance to the OECD is not the only dilemma for those who wish to draw policy conclusions for developed countries. The rather atheoretic approach of the macro-economic literature on education and growth has attracted a certain amount of criticism, notably from labour economists. One argument, used by Topel (1999), is that the measured effect of the initial level of human capital is simply too large to be credible. This claim ultimately rests on the assumption that traditional earnings functions roughly capture the social returns to education, which may take too narrow a view of the potential growth benefits.

Another argument perhaps has more force. Starting with Pritchett (1996), researchers have noted the implications of traditional earnings functions for analyses at the cross-country level. If an individual's education contributes directly to his or her productivity, in the manner envisaged by labour economists, we should expect to observe a cross-country correlation between the change in output per worker and the **change** in average educational attainment, at least after controlling for other variables. Furthermore, it should be possible to detect this effect regardless of whether or not the initial **level** of educational attainment determines growth.

This argument has shifted the focus of research toward regressions that relate growth to the change in educational attainment, rather than its level. Several well-known studies have found the correlation to be surprisingly weak; Benhabib and Spiegel (1994) and Pritchett (1996) both come to this conclusion for a large sample of countries.[15] Benhabib and Spiegel do find a statistically significant correlation between the level of educational attainment and growth for the wealthiest third of the sample (their Table 5, model 2) but no connection between the change in attainment and growth in a larger sample.

It is possible to question this latter result, as in Temple (1999b), since a strong relation can be discerned when some influential outliers are eliminated. There are a number of other problems that dictate caution in reading these papers. One is the specification chosen for the relation between years of schooling and output. The specification adopted by Benhabib and Spiegel, and by Pritchett, implicitly assumes that the returns to an extra year of schooling are much higher at low levels of schooling than at high levels. As Topel (1999) points out, this runs contrary to the standard semi-logarithmic formulation for earnings functions, which in its simplest form assumes that the returns to an extra year of schooling are independent of the level of schooling. When growth regressions are specified in a way more compatible with this idea, the evidence for a growth effect of changes in human capital is rather stronger.[16]

Krueger and Lindahl (1999) have argued convincingly that another important problem is likely to be measurement error. The difficulty is that a specification based on an aggregate production function (as in Benhabib and Spiegel) typically seeks to explain growth using the change in educational attainment, but first-differencing the education variable in this way will usually exacerbate the effect of any measurement errors in the data.

To support this argument, Krueger and Lindahl examine the correlation between two different measures of the change in average years of schooling that have been used in the literature. The correlation is low enough to suggest that a substantial component of the measured change in educational attainment is uninformative noise. As a consequence, regressions that use the change in education to explain growth will tend to understate its importance.[17]

The case for seeing measurement error as an important part of the story has been considerably strengthened by the careful and impressive work of de la Fuente and Domenech (2000). Unusually, they restrict attention throughout to OECD members. Their close examination of standard data sets reveals that schooling levels for some countries appear implausible; some of the figures for average years of schooling display surprising short-run volatility; and others appear to give a misleading view of trends. Other writers, notably Steedman (1996), have also noted inconsistencies in the way data on human capital are collected and compared.

By drawing on national sources and more recent figures compiled by the OECD, de la Fuente and Domenech compile a new and more reliable data set of education measures for OECD countries. In their empirical work, they find that changes in output and educational attainment are positively correlated, even in panel estimates that include country and time-fixed effects. This supports the idea that, where previous researchers have failed to detect an effect, this may be due to measurement error.

Overall, this literature is beginning to suggest that there is a correlation between changes in education and growth, of the kind that most labour economists would expect to observe. This is reassuring, but there are a number of interesting open questions. One obvious question mark surrounds the interpretation of the earlier results that related growth to the initial level of attainment, rather than the change in attainment. Growth studies for the OECD that allow a role for both possibilities simultaneously are yet to appear. This may be an important omission, especially when one recalls the possible role for human capital in the creation of new ideas, and thereby the possible connection between the level of education and subsequent growth.

There is another reason why the effect of the initial level of education remains of some interest. Studying the relation between the change in output and the change in education remains somewhat vulnerable to the charge that causality runs from output (or anticipated output) to education, and not simply vice versa.[18] To a large extent, changes in educational attainment are driven by government policy. It seems plausible that as output and tax revenues increase, governments will often allocate more resources to education, and attainment will rise.

Yet the argument that panel data results, such as those of de la Fuente and Domenech (2000), are driven by reverse causation is rather less strong than it may appear at first. This is a key advantage of their use of data on average years of schooling in the population, rather than enrolment rates. Given that new entrants are typically a small fraction of the labour force, average attainment will change only very slowly in response to any change in educational provision. It, therefore, seems rather unlikely that reverse causation explains the de la Fuente and Domenech results.

Where does this leave us? Earlier in the survey, we saw the important qualifications that surround micro estimates of the social returns to schooling. Ultimately, we would like the cross-country evidence to shed light on the accuracy of these estimates. In practice, we are likely to remain some way short of this goal, at least in the absence of better data. The aggregate evidence is currently too fragile to draw any strong conclusions about the possible extent of social returns.

Even so, the results we have provide some grounds for optimism, and it is reassuring that several recent studies find education to be important despite the likely presence of measurement error. This suggests that better data, and more sophisticated methods, may yet lead to a steady improvement in the precision of our estimates of the growth effects of education. The prospects for this should not be exaggerated, but there is certainly more reason to be hopeful now than in the early days of the literature, when the various sets of estimates were hard to reconcile into any kind of coherent story.

Another advantage retained by the macro-economic approach, compared to micro estimates, is that we can explore indirect effects of education, notably those working through investment. These effects appear in the model estimated by MRW, and may have wider relevance. Two-sector models of endogenous growth, such as those reviewed in Barro and Sala-i-Martin (1995, ch. 5), typically yield a steady state in which there is an equilibrium ratio of human capital to physical capital. An immediate consequence is that a rise in educational attainment will eventually be met with a corresponding rise in the stock of physical capital.

Analysing the consequences for welfare is not wholly straightforward. The distinction between output and welfare matters, since the extra output directly associated with education could be allocated to consumption rather than increasing the capital stock. Growth economists have not yet developed and calibrated a model which derives overall output and welfare effects of education based on sensible microfoundations for investment.[19] This may explain why the effect is ignored by most interpretations of the empirical literature on education and growth. For now, it is important to be aware that growth accounting and growth regressions, by using capital investment as one of the conditioning variables, may understate the total impact of an increase in educational attainment on output per worker. The probable magnitude of this effect, and its significance for welfare, remain uncertain.

3.4. Human Capital Externalities

As we have seen, one important motivation for looking at the macro data is the possible presence of externalities to human capital. In this section, I will briefly review recent theory and evidence on this topic, before section 3.5 draws together the various strands of evidence on education and growth.

Interest in human capital externalities was revived by Lucas (1988, 1990). One of his arguments was that, in the absence of such externalities, it is difficult to reconcile observed pressures for migration from poor to rich countries with the absence of massive capital flows in the other direction.[20] He also drew on the work of Jacobs (1969) to argue that such externalities are a natural explanation for the existence of cities.

In more recent work, Acemoglu (1996) has provided an ingenious justification for the presence of externalities. His theory is based on micro-economic foundations, and so is particularly worthy of attention. In his model, firms and workers make investments in physical capital and human capital respectively, before production begins. Production requires a partnership between a firm and a worker, but when firms or workers make their respective investments, they do not know the identity of their future partner. A key assumption of the model is that firms and workers are then brought together via a matching process that is imperfect, perhaps because searching for partners is costly.

Acemoglu shows how the structure of the model yields an important result: an increase in the average level of human capital can have a positive effect on the private return to human capital, at least over some region. The intuition is as follows: say that a sub-set of workers decides to acquire more human capital. This will raise average human capital, and anticipation of this encourages firms to make greater investments in physical capital. Since the matching process is inefficient, the firms that have invested more are not necessarily matched with the workers who have invested more in human capital. As a result, some of the other workers will gain from the increase in average human capital, since they are matched with firms using more physical capital than before, and in this sense the average level of human capital has an external benefit.

Work of this kind has helped to motivate the recent search for externalities in the data. As we have seen, the empirical growth literature gives rather imprecise answers about the social returns to education. Some researchers have pursued an alternative approach which may be more informative, based on survey data sets that include individuals who live in different cities. The idea is to estimate human capital earnings functions in the normal way, but with one important addition: for each individual, they also include the average level of schooling in that individual's city. The central idea is that, if there are significant externalities to human capital, individuals should earn more when they work in those cities with a higher average level of schooling. The exercise will miss externalities that work at the national level, perhaps through social structures or institutions, but it remains of considerable interest.

Several studies based on this idea have been carried out for the US. The initial results of Rauch (1993) appeared promising. Consider otherwise similar individuals living in two different cities, the second city with a population that has an extra year of average schooling. His estimates suggested that each individual living in the second city could expect to gain a wage premium of around 3 percent, an effect large enough to be worthy of further investigation.

Unfortunately, as Ciccone, Peri and Almond (1999) point out, there is an important argument against interpreting the observed wage premium as solely driven by externalities. Differences in average years of schooling across cities are likely to be associated with differences in the relative supplies of skilled and unskilled labour. These relative supply effects may give rise to an apparent wage premium for average schooling even in the absence of externalities.

The empirical work of Ciccone et al. (1999) supports this proposition. When they follow Rauch and do not allow for relative supply effects, they are able to obtain a high and precise estimate of the social return to education. In a more general approach, which builds in a role for supply effects, the measured externalities are greatly reduced; indeed, it is not possible to reject the hypothesis that externalities are absent altogether. Related work by Acemoglu and Angrist (1999) also indicates that the overall social returns to education may be close to the private returns, this time using the variation in average schooling across US states to capture the effects of externalities.

3.5 A Tentative Summary of the Evidence

At this point, one may be left wondering what the evidence ultimately achieves in terms of lessons for policy. The most useful perspective is probably to combine the various strands of evidence and see whether they form a coherent whole, despite the problems inherent in each.

Labour economists seem to be agreed that the private rate of return to a year's extra schooling is typically between 5 and 15 percent. Working under similar assumptions, growth accountants find that increases in educational attainment account for perhaps a fifth of growth in output per worker.

Labour economics and growth accounting have a relatively long history, and the strengths and weaknesses of the available evidence are well understood. It is possible that both approaches overstate the social benefits of education because of signalling effects, or a correlation between education and unobservable characteristics. Acting in the other direction, the estimates provided by this research may understate the role of education, because they rarely allow measurement of externalities, or quantify the importance for productivity of an improved matching between workers and jobs.

The great strength of the emerging macro-economic literature is that, at least in principle, it could provide a direct test of the productivity benefits. As we have seen, however, this field has significant weaknesses of its own. Answers that are sufficiently accurate and robust to allow confident conclusions are some way off. They may have to wait until growth economists have longer spans of data to work with, and greater skill at matching a variety of possible statistical techniques to the question at hand.

With these caveats in mind, a brief summary of the macro-economic literature may be useful. Although in some ways such an exercise is rather premature, it should at least prevent the unwary from jumping to an over-hasty conclusion based on the reading of one or two papers alone. That would be an easy mistake to make. Over the last 10 years, growth researchers have bounced from identifying quite dramatic effects of education, to calling into question the existence of any effect at all.

More recent research is placed somewhere between these two extremes, but perhaps leaning closer to the original findings that education has a major impact. In examining the studies that have not detected an effect, we have some convincing reasons (measurement error, outliers, incorrect specification) to doubt such results. The balance of recent evidence points to productivity effects of education which are at least as large as those identified by labour economists. This should reassure us that most countries are not over-providing education, especially as educational wage differentials have shown little sign of narrowing over time. I will return to this topic, and the implications for policy, in the final conclusions.

4. Social Capital and Growth

This section moves away from education, and concentrates on the idea of "social capital," and its role in growth. Before describing the underlying ideas in more detail, it may be helpful to discuss their role in the wider context of empirical growth research. One reason for this is that a focus on social capital is relatively controversial: certainly compared to education, where there is general agreement that education is likely to be important, even if our measurements of its effect are imprecise.

Ideally, researchers studying development and growth would like to find a set of policy interventions sufficient to raise living standards and welfare. It is sometimes argued that this is an impossible goal, partly because the circumstances of each country are unique. A less extreme position is that growth research can give us some insight into possible generalizations by telling us about the average pattern; at the same time, it should be recognized that any proposed set of "sufficient" conditions will never be universal.

One way of making our generalizations more widely applicable is to discriminate more finely between societies, by introducing extra dimensions into our analysis of the growth process. This cannot be pushed too far, since we only have a limited set of countries, and a limited time span, from which to draw evidence. The central challenge for growth researchers is to identify the dimensions that are most relevant for growth, without endlessly multiplying the possibilities in such a way that we ultimately ask too much of the data. At the moment, the hope appears to be that a coherent picture will ultimately emerge through a gradual accumulation of evidence, as empirical researchers both introduce new variables and indicate that some earlier proposals should be discarded. The fundamental problem here is that the most general model, which in principle would allow us to discriminate easily between the competing hypotheses, has already become too large to be informative (Levine and Renelt 1992).

In this context, in explaining growth, it makes sense to concentrate on those dimensions of societies which have a strong prior claim on our attention. Among the dimensions recently proposed for further investigation, one stands out as both promising and – in terms of its prior claim – relatively controversial. The concept of "social capital" appears to be a potentially formidable way of discriminating between countries and their growth prospects. It provides a useful umbrella term for those aspects of societies which, though difficult to measure and incorporate into formal models, are widely thought to be an important determinant of long-run economic success. For some economists (not all), the intuition that "society matters" is strong enough to outweigh the current absence of much in the way of a theoretical underpinning.

There is a long academic tradition that something is not fully understood until it can be measured, and the concept of social capital presents serious problems of definition, let alone measurement. But in this respect, it is interesting to note the comment of Lucas (1988, p. 35) about the early days of human capital theory. He wrote that "the idea of human capital may have seemed ethereal when it was first introduced – at least, it did to me – but after two decades of research applications of human capital theory we have learned to 'see' it in a wide variety of phenomena." The possible analogy with the present and future status of social capital should be clear.

Overall, it is easy to see why growth economists and others have started to emphasize social capital only very recently, even though the basic ideas have a long intellectual history. In this part of the survey, I will discuss some of the most recent work, starting with a discussion of the nature of social capital (section 4.1). This provides a necessary backdrop for section 4.2, which covers the limited cross-country evidence so far available, most of it based on survey evidence on willingness to trust. The implications for policy may seem rather meagre, but it should be remembered that this literature is still in its early stages. Section 4.3 will discuss some of the questions that remain to be answered.

4.1 What Is Social Capital?

It is widely acknowledged that social capital needs to be carefully defined, if it is to prove anything more than suggestive in thinking about growth. Woolcock (1998) provides a brief history and a very useful exploration of the forms of social capital, from which this discussion will draw heavily.

One of the best known and most representative definitions can be found in the highly influential work of Putnam (1993): "social capital…refers to features of social organization, such as trust, norms, and networks, that can improve the efficiency of society by facilitating coordinated actions" (p. 167). As Woolcock and others have noted, this is useful but comes close to defining social capital in terms of its function, so that it becomes difficult to separate analytically the sources of social capital from its consequences. As an example, social capital in the form of trust may be created by participation in civic associations, but these associations could themselves be regarded as an important form of social capital. The importance of this point is reinforced when one considers that social capital may also have costs: one person's valuable network may be another's restrictive interest group.

Many discussions of social capital, including those of Putnam (2001), Schuller (2001) and Woolcock (2001), associate it with a resource that is useful in achieving common objectives. For example, the suggested definition of Woolcock (2001) is that "social capital refers to the norms and networks that facilitate collective action." This emphasis on collective action may be problematic for economists who wish to make wider use of the idea. As I will discuss later, an understanding of the formation of social capital is likely to require an understanding of its value as a resource to individuals (Glaeser 2001). This can easily conflict with a definition of social capital that emphasizes its role in collective action, in the usual sense of the latter term. For example, an entrepreneur who gains knowledge from participating in various networks is arguably benefiting from social capital, and this benefit occurs, and may be worthy of analysis, even if the entrepreneur does not share goals, objectives or outcomes with others.

A broader exploration of the term can be found in Woolcock (1998). He proposes a scheme in which it has four dimensions, roughly corresponding to (i) the extent of horizontal associations; (ii) the nature of social ties within communities; (iii) the nature of the relation between civil society and the state; and (iv) the quality of governing institutions. Independently of the social capital literature, economists have made some progress under category (iv), in analysing the growth impact of the quality of institutions (for instance, Knack and Keefer 1995). At least for present purposes, it is not clear that bringing this work under the umbrella of social capital will yield extra insight.[21] In any case, measuring the benefits of good institutions is arguably a less urgent task than formulating practical advice on how to improve bad ones, and the growth literature does not have much to offer here.

With these points in mind, this survey will mainly restrict itself to recent empirical work that uses the extent of trust in a society as an indicator of its underlying social capital. It should already be clear that this is an imperfect and simplistic way of capturing the ideas of Putnam and others. Trust may be determined by social capital, but also by other aspects of societies; and the extent of trust may be influenced, in very different ways, by all four of the dimensions of social capital identified by Woolcock.

In the present context, the focus on trust retains two key advantages. First and most importantly, trust can potentially be measured in a way that is comparable across countries, as we will see below. Second, although a focus on trust does not allow us to discriminate between the growth effects of different forms of social capital, it may be a valuable way of collapsing the various aspects of social capital into one quantifiable variable. As emphasized earlier, given the nature of our cross-country data sets, it can be valuable to limit the number of dimensions that we seek to explore, at least in preliminary work.

4.2 Empirical Evidence

The most important macro-economic evidence on social capital takes the World Values Survey as its starting point. The 1981 survey is based on responses from thousands of individuals across 21 market economies, while the 1990-91 survey covers 28 market economies. Overall, 29 market economies are covered at least once. The selection of respondents is not completely random, but adjustments to take this into account are available.[22] Among the issues addressed in the surveys, economists have mainly focussed on a question designed to capture willingness to trust. Respondents were asked, "Generally speaking, would you say that most people can be trusted, or that you can't be too careful in dealing with people?" The percentage of respondents in each nation replying "most people can be trusted" forms a potentially useful index of trust.[23] Table 1 shows values for this index, TRUST, for those OECD countries covered in the survey, and also for a small selection of less developed countries.

Table 1

Data for some OECD members			
Norway	61.2	Ireland	40.2
Finland	57.2	Korea	38.0
Sweden	57.1	Spain	34.5
Denmark	56.0	Austria	31.8
Canada	49.6	Belgium	30.2
Australia	47.8	Germany	29.8
Netherlands (the)	46.2	Italy	26.3
United States	45.4	France	24.8
United Kingdom	44.4	Portugal	21.4
Switzerland	43.2	Mexico	17.7
Iceland	41.6	Turkey	10.0
Japan	40.8		
Non-OECD members			
India	34.3	Nigeria	22.9
South Africa	30.5	Chile	22.7
Argentina	27.0	Brazil	

Source: Knack and Keefer (1997).

A measure of trust

Clearly, measurement error is potentially a major problem in using such data. Interestingly, for the 20 countries with TRUST values for both 1981 and 1990, the correlation between the two is 0.91. Knack and Keefer (1997) also report on an interesting experiment, in which a large number of wallets containing $50 were deliberately "lost" in a number of cities. The percentage of "lost" wallets that are returned to their owners in each country has a correlation with TRUST of 0.67, providing a tentative indication that people are genuinely more trustworthy in countries with high values of the TRUST index.

Knack and Keefer (1997) also construct a second index, CIVIC, designed to capture the strength of norms of civic cooperation. The index is constructed by averaging across five questions, addressing the attitudes of the respondents to such things as fraudulent benefit claims and avoidance of fares on public transport. Perhaps surprisingly, this index shows relatively little variation across OECD countries, although it is positively correlated with TRUST. In what follows I will concentrate on the empirical evidence relating to the TRUST variable; Knack and Keefer note that results are broadly similar when CIVIC is used in its place.

Before turning to the evaluation of the results, it is worth examining the data in Table 1 more closely. Most of the empirical work is based on samples that contain a small number of less developed countries, as well as OECD members; as a result, one might be concerned that poorer countries are responsible for most of the identifying variation in the TRUST variable. The evidence of Table 1, however, suggests that there is substantial variation in TRUST across OECD members.[24]

The index of trust is used by both Knack and Keefer (1997) and La Porta et al. (1997). Both these studies report cross-country regression evidence relating a wide variety of dependent variables to trust and a number of controls. In many cases, the results should be regarded as indicating the existence of associations, rather than establishing a causal relationship.

The evidence for causality is arguably strongest in the regressions seeking to explain growth in output per head. La Porta et al. (1997) report that the trust index is weakly associated with growth over 1970 to 1993, although the explanatory power of their growth regression is low and the sample includes some countries that were centrally planned during this period. This suggests that one should be quite careful about drawing conclusions for OECD members.

Knack and Keefer exclude socialist countries and focus on a shorter period, 1980 to 1992. They find stronger results. Controlling for initial income per head, a human capital variable, and the relative price of investment goods, they find that a one standard deviation change in the trust index is associated with a change in the growth rate of 0.56 of one standard deviation. In alternative terms, a level of TRUST that is 10 percentage points higher (slightly less than one standard deviation) is associated with an annual growth rate that is higher by 0.8 percentage points.

This is an effect large enough to be of great interest, so Knack and Keefer carry out a number of robustness tests. When influential outliers are deleted, or growth analysed over longer periods (1960–1992 and 1970–1992), the point estimate of the growth effect is roughly halved, but remains statistically significant (see their Table II). They do note that, over the longer time span, the effect of TRUST is not always robust to the inclusion of other explanatory variables in the growth equation.

The evidence suggests that the effect of TRUST is large enough to be worthy of further investigation. It is important to note, however, that results are typically less strong when attention is restricted to a sample of OECD countries. Also using World Values Survey data, Helliwell (1996) found a negative effect of trust on growth in a sample of 17 OECD members. Knack (2001) reports that in a sample restricted to 25 OECD members, the effect of trust is imprecisely measured, and the hypothesis that it has no effect cannot be rejected at conventional significance levels.

These are quite small samples, so in a sense it is not surprising that trust is insignificant when attention is restricted to the OECD. Results are probably sensitive to the choice of conditioning variables, while outliers may play a role in hiding a relationship. Knack (2001) makes two other useful points in relation to the OECD results. First, as in Knack and Keefer (1997), there is evidence that the effect of trust is greater in low-income countries, based on an interaction term in the growth regressions. Even if one is sceptical that trust matters for the high-income members of the OECD, it may still play an important role in poorer countries like Mexico and Turkey. Secondly, Knack (2001) reports a statistically significant and positive correlation between investment and TRUST within an OECD sample, supporting the idea that trust plays some role even for richer nations.

Both La Porta et al. (1997) and Knack and Keefer (1997) report evidence on other interesting associations between TRUST and indicators of performance. La Porta and associates find strong positive associations between TRUST and a number of measures of government performance, including the effectiveness of the judiciary and the quality of the bureaucracy (their Table 2). Knack and Keefer present very similar results (their Table V). They also provide some evidence that the effect of trust works through raising the share of investment in GDP.

These results are intriguing, but one should be careful to avoid jumping to strong conclusions about the importance of trust. A central problem is that the extent of trust may well be determined by, or correlated with, other aspects of societies that are omitted from the growth regressions. For instance, it may be that corruption or weak legal enforcement lowers trust and, for quite independent reasons, the growth rate. As Knack and Keefer note, one could even tell a story in which trust is a product of optimism in societies that are performing well in economic terms.

In regarding trust as potentially an endogenous variable, the role of education is particularly interesting from the point of view of the present survey. La Porta and associates (1997, p. 336) write that trust has a positive effect on educational achievement, but it should be clear that causality may run in the opposite direction. Knack and Keefer report a strong correlation (r = 0.83) between TRUST and an estimate of average years of schooling for 1980, and note that "education may strengthen trust and civic norms, for example, if ignorance breeds distrust, or if learning reduces uncertainty about the behavior of others, or if students are taught to behave cooperatively" (p. 1270). If we see trust as endogenous to the extent and quality of education, we have the beginnings of a potentially important story about externalities to education, of the kind briefly discussed earlier.

4.3 The Future for Social Capital Research

Given that interesting and suggestive evidence for the importance of social capital has been compiled in so short a time, further research on social capital appears to have a bright future. To live up to this promise, however, there are at least two potentially difficult questions that will need to be addressed. The first question concerns the origins and formation of social capital; the second, the precise mechanisms by which social capital, once formed, gives rise to particular micro-economic and macro-economic outcomes.

It should be clear that, to incorporate the ideas of the social capital literature in policy advice, we will often need to understand how social capital is created, and how it might sometimes be undermined. In line with the usual methods of economists, Glaeser (2001) has convincingly argued that we need to give more attention to the value of social capital as a resource for individuals, as well as for communities as a whole. It seems unlikely that social capital is best understood as simply an unintended by-product of other decisions. With this in mind, we need a model that captures the incentives of individuals to form or undermine social capital, and which also shows how these incentives are affected by policy. Without such a model, our knowledge of policy implications will remain incomplete, however strong our intuition and evidence that social capital matters.

It can seem that social capital resists the usual methods of analysis of economists, given that it is usually understood to be a property of groups rather than individuals. The Glaeser argument works well for the "networks" aspect of social capital, since participation in networks can be modelled as the outcome of individual investment decisions; the argument is less clearly applicable to other aspects of social capital, such as social norms. Yet even for social norms, such as the value of trustworthiness, it is possible to analyse their creation and evolution in terms of individual decisions to observe (or not to observe) the prevailing norm. Economists have recently started to give greater attention to constructing models in which social norms are endogenous, and it seems probable that this work will yield some valuable insights.[25]

A second, and related, question concerns the precise mechanisms by which social capital, once in place, affects economic outcomes. Again, formal modelling may be useful. For example, Zak and Knack (1999) present a model in which agents divide their time between production and verifying the actions of those they transact with. Their model captures the simple idea that in low-trust societies, some resources and time are diverted to verification, and this results in lower output.

It will be very difficult to discriminate between alternative theoretical models using macro-economic data. Studies based at the micro level will often be rather more informative, and some interesting empirical work has already started to appear. Guiso, Sapienza and Zingales (2000) argue that one of the best testing grounds for the importance of social capital may lie in the financial sector, since it is here that trust may be especially relevant to economic activity. They study this effect within Italy, using a measure of civic engagement (essentially voter turnout in certain elections) as a proxy for social capital, as in Putnam (1993). Using large samples of households and firms, they find that their measure of civic engagement helps explain variation in financial practices across Italian regions, even when controlling for different levels of development.

Such studies are likely to play an increasingly important role in the wider debate on the importance of social capital. Sceptics will remain unconvinced by the economic importance of trust and other aspects of societies (networks, norms, participation) until we have a more complete and detailed story describing their connection to economic outcomes, supported by reliable evidence.

5. Summary and Conclusions

Where does all this leave us in thinking about policy? I will again consider education first. Griliches (1997, p. S339) notes that for academic economists, an emphasis on the importance of education for economic growth "may be somewhat self-serving" and occasionally in the literature one does come across a paper which echoes to the sound of grinding axes. This is particularly true in reading opposing assessments of the signalling argument, where the lack of evidence does not seem to preclude strong views on the importance or otherwise of the central claims.

In assessing the empirical evidence for productivity benefits of education, it is quite possible that an overall judgement is frequently contaminated by a keen awareness of wider benefits of education that are not captured in economic data. After all, one could probably construct a viable case for much educational expenditure entirely based on its implications for personal development, independent of any productivity effects. It is worth quoting Weiss (1995, p. 151):

> Education does not have to be justified solely on the basis of its

> effect on labour productivity. This was certainly not the argument given by Plato or de Tocqueville and need not be ours. Students are not taught civics, or art, or music solely in order to improve their labour productivity, but rather to enrich their lives and make them better citizens.

Most economists, appropriately enough for practitioners of the "dismal science," have concentrated on examining a rather more narrow case for education, in terms of its contribution to productivity growth. As we have seen, the weight of evidence points to significant productivity effects, but the degree of uncertainty is large, and even a lower bound is surprisingly difficult to establish.

The evidence from labour economics has the greatest weight of experience, time and academic firepower behind it, and this suggests that it would be a mistake to summarize the macro-economic results in isolation. Although a reconciliation of these two literatures is in its early stages, the correlation across countries between measures of human capital and growth is arguably robust enough to support the belief that earnings functions pick up genuine productivity effects, and not simply the effects of signalling or omitted characteristics.

That is reassuring, but it leaves many questions open for policy makers. There is likely to be pervasive heterogeneity in rates of return across individuals, let alone across countries. A greater understanding of the pattern of heterogeneity will lead to better policy decisions, but on this subject the macro-economic literature surveyed here is necessarily silent. Evidence compiled by labour economists will be far more useful in this respect.[26]

Other limitations of the macro-economic evidence are worth noting. Growth regressions are best thought of as picking up an average effect of schooling, and should certainly not be used to conclude that every OECD member is currently under-providing education. Indeed, the results from growth accounting exercises suggest that, although increases in educational provision can yield a worthwhile increase in the growth rate, one should not necessarily expect an effect that is large relative to current rates of growth. For policy makers who wish to raise the growth rate, policy on education remains a natural place to look, but it is by no means a panacea.

Some other evidence sheds important light on the extent to which current educational provision is appropriate. Particularly relevant is the evolution of educational wage differentials since the late 1970s. Even though the relative supply of skilled labour has increased, there has been a substantial and well-documented increase in educational wage differentials in the UK and the US, with less pronounced changes in other OECD countries (see, for instance, Katz and Autor 1999, pp. 1501–1503).[27] It seems difficult to explain the evidence for the UK and the US without a dominant role for a shift in the relative demands for different types of labour, favouring the more educated.

Much research has focussed on the origins of the change in relative labour demand, but for policy makers an equally important question is whether this change is generating a rising return mainly to education, or to other characteristics such as innate ability or initiative. Clearly, the policy implications are very different under the alternative scenarios, yet disentangling the two effects is difficult. Existing research often finds that it is the return to ability which is rising; but the work of Cawley, Heckman and Vytlacil (1998) suggests that, due to some important identification problems, these results are not robust to small changes in assumptions.

The recent shifts in differentials remind us, once again, that policy on education matters far more than productivity. There are also likely to be important consequences for inequality, as discussed by Topel (1997). Given that trade does not seem to equalize factor prices across countries, any increase in the relative supply of skilled labour is likely to lower the wage premium for the possession of skills. In turn, this could make an important contribution to reducing income inequality.[28]

This survey began with the observation that OECD members spend about 6 percent of their collective GDP on education, or $1,300 billion each year. That is a major commitment of resources, but on the available evidence, including recent changes in wage dispersion, the arguments for cutting back on provision seem rather weak. In deciding the extent to which provision should be expanded, perhaps the key open question is the validity of the signalling arguments. More evidence on the signalling debate would be extremely helpful in judging the benefits of further educational expansion, and perhaps especially the benefits of expanding higher education, one of the main changes in provision within the OECD since the 1960s.

In exploring some of the details of such arguments, empirical evidence is not the only way forward. Theory and calibration exercises may also shed light on these issues. From a policy perspective, an interesting implication of new growth theory is that individuals may under-invest in education, because those who later go into research careers do not capture all the benefits of the new ideas that they help to create. This provides the beginnings of an argument for subsidizing education in engineering and science, at least at those levels (perhaps PhDs, or post-docs) where a high proportion of individuals subsequently go into R&D activity. As we have seen, measuring the benefits would be difficult, but some progress may be possible by calibrating simple theoretical models, as in Rustichini and Schmitz (1991).

The literature on social capital and growth is at an earlier stage than the macro-economic evidence on education, and the policy implications are less clear. Indeed, one weakness of the social capital literature, at least in relation to richer countries, is that it is currently difficult to see what policy conclusions could ever be drawn. What can a policy maker in Mexico or Turkey actually do, confronted with the evidence from the World Values Survey that they govern a low-trust society? Standard recommendations, such as attempting to eliminate corruption and improve the legal system, are nothing new, and make good sense quite independently of any emphasis on social capital.

Perhaps the best answer lies in drawing an analogy with the introduction of human capital theory into economics. In its early stages, as Lucas (1988) makes clear, this too seemed a rather ethereal concept, and presumably one with little immediate message for education policies. Work on social capital is still in its early stages, and as we learn more about what it is, where it comes from and what it does, there may ultimately be implications and conclusions that leave our successors wiser in ways that we can only guess at.

Appendix – Growth Effects of Education in MRW

Mankiw, Romer and Weil (1992) estimate a simple model in which human capital is accumulated in the same way as physical capital. An interesting feature of this model is the way in which the presence of physical capital raises the overall impact of education. The rate of investment in physical capital is assumed to be a fixed proportion of output, and so anything which raises output, including extra investments in education, will raise the steady-state stock of physical capital per worker. This means that, in calculating the effect of education on growth, we also need to take into account its indirect effect via physical capital. MRW's specification of a complete growth model, simple though it is, allows us to gauge the magnitude of the total effect.

The aggregate production function is assumed to be:

$$Y = K^{\alpha} H^{\beta} (AL)^{1-\alpha-\beta}$$

where Y is output, K is physical capital, H is human capital, A is an index representing technical efficiency, and L is the labour force. Hu $\dot{H} = s_h Y - \delta H$ is accumulated as follows:

where s_h is the fraction of output invested in human capital, and δ is the rate of depreciation of human capital. Using results in MRW, it is possible to show that if the human capital investment ratio s_h is multip $\frac{Y'}{Y'} = \theta$ factor θ, output per worker will ultimately rise by a factor:

The growth regressions in the MRW paper for the OECD sample yield estimates for the key parameters of $\alpha=0.38$ and $\beta=0.23$. Taken at face value, these estimates imply that if human capital investment as a fraction of output is increased by a tenth (so $\theta=1.1$) then output per worker will rise by 6 percent; if the human capital investment ratio is doubled, output per worker will eventually rise by about 50 percent. This illustrates the potential importance of education, although it should also be noted that the model lacks strong microfoundations. In a model with a more complete specification for the determination of investment, education might be rather less important.

Notes

[1] I am grateful to Gavin Cameron, Damon Clark, Tom Healy, John Martin and Mark Pearson for very helpful comments on an earlier draft.

[2] The expenditure share is taken from OECD (1997, p. 51). The figure for collective GDP is based on total OECD GDP in 1997, at 1997 prices and exchange rates (OECD 1999, p. 143). The figure excludes Korea, the Czech Republic, Hungary and Poland.

[3] One consequence of this omission is that I will have to ignore the interaction between education and training. To the extent that education is about "learning how to learn," it may have consequences for the value of subsequent on-the-job training. Also note that some international comparisons of training programs can be found in OECD (1998, ch. 3).

[4] The interaction between growth, human capital and female labour force participation is discussed in more detail by Mincer (1996). For evidence on female labour force participation in the OECD, see OECD (1998, ch. 4).

[5] A more detailed and rigorous summary can be found in Aghion and Howitt (1998, ch. 10).

[6] The assumption that it is difficult to fully capture the benefits of research is uncontroversial. The presence of substantial research spillovers is intuitively plausible, and supported by empirical evidence. Griliches (1992) provides a survey.

[7] A complete welfare analysis of policy intervention would need to consider the effects on the level of the output path, as well as its growth rate.

[8] Another very useful survey is that of Ashenfelter, Harmon and Oosterbeek et al. (1999), which includes a detailed investigation of problems associated with publication bias.

[9] Alternatively, the twins evidence remains informative in the unlikely case where each employer of a twin knows the wage and schooling of the other twin.

[10] For example, more able individuals may choose to stay longer in school because they derive a greater consumption benefit.

[11] Barro and Sala-i-Martin (1995, p. 352) make this point in greater detail.

[12] Other papers which discuss the robustness of the MRW results for the OECD sample include Nonneman and Vanhoudt (1996) and Vasudeva Murthy and Chien (1997). A more general discussion of statistical problems associated with growth regressions can be found in Temple (1999a).

[13] There is also important work on human capital as a determinant of technological catch-up using data at the sectoral level. For example, Cameron, Proudman and Redding (1998) investigate the role of human capital and openness to trade in explaining catch-up by UK manufacturing sectors.

[14] Of the two measures, only the secondary school enrolment rate is likely to be relevant in explaining growth within the OECD. Englander and Gurney (1994a) report that average secondary enrolment in the OECD was about 70 percent in 1960, so there may be enough variation across countries for regression evidence to be informative.

[15] This finding is also associated with a number of panel data studies using fixed effects, but these results should almost certainly be discounted. Researchers using panels typi-

cally do not allow for lags in the effect of variables like enrolment rates. In any case, given the way the education data are constructed, the time series variation is probably too noisy to draw sensible conclusions.

[16] At this point, it is worth noting that the assumption of stable marginal returns is based mainly on evidence from developed countries. In such countries, given compulsory schooling laws, the range of variation for (measured) educational attainment is relatively low. That is not true for the poorer countries included in these samples, and the appropriate specification for marginal returns at very low levels of schooling remains an open question.

[17] Note, though, that measurement error in other explanatory variables (notably physical capital) could bias the coefficient on education in the opposite direction.

[18] The two-way interaction between growth and education is discussed in more detail by Mincer (1996). As Bils and Klenow (1998) argue, the direction of causality may be uncertain even when attention is restricted to the growth effect of the initial level of education.

[19] Although some theoretical work has started to appear: Masters (1998) analyses the efficiency of investments in human and physical capital in a bilateral search context.

[20] Lucas (1990) sets out the details of this argument.

[21] Following Abramovitz (1986), Temple and Johnson (1998) have suggested the use of the term "social capability" rather than social capital for social arrangements and institutions defined more broadly.

[22] For a more detailed discussion, see Knack and Keefer (1997).

[23] Note that someone's response to the survey question may tell us more about his or her own trustworthiness, rather than a view of trust in the person's country as a whole. Even then, the pattern of responses may form a useful guide to the prevalence of trust in a particular country (see, for instance, Glaeser 2001).

[24] The scatter plots presented in Knack and Keefer are also reassuring in this respect, as they suggest that the partial correlations between growth, investment and TRUST that will be discussed later are not simply driven by the inclusion of a few less developed countries.

[25] Many references to research in this area can be found in Zak and Knack (1999).

[26] A special issue of the journal *Labour Economics* (November 1999) includes studies that measure the returns to schooling for a variety of OECD member countries, and thus sheds light on the possible heterogeneity across countries.

[27] Evidence on recent trends in wage dispersion more generally can be found in OECD (1996, ch. 3).

[28] One has to be careful in making this argument, even in a simple model with just two types of labour. Inequality depends not only on the skill premium, but also on the relative supplies of skilled and unskilled labour.

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